Croplife®

A BUSINESSPAPER FOR THE FARM CHEMICAL INDUSTRY

MEMBER, BUSINESS PUBLICATIONS AUDIT

BPA

A Miller Publication
Business Journalists Since 1872

Vol. 8 NOVEMBER, 1961 No. 11

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Controlled Circulation Postage Paid at Minneapolis, Minnesota

Published Monthly by The Miller Publishing Co. P. O. Box 67, Minneapolis 40, Minn.

Subscription Rates: $5 for 1 year; $8 for 2 Years
Single copies 50¢

Fertilizer Industry Round Table Meeting Concentrates on Materials Handling Theme

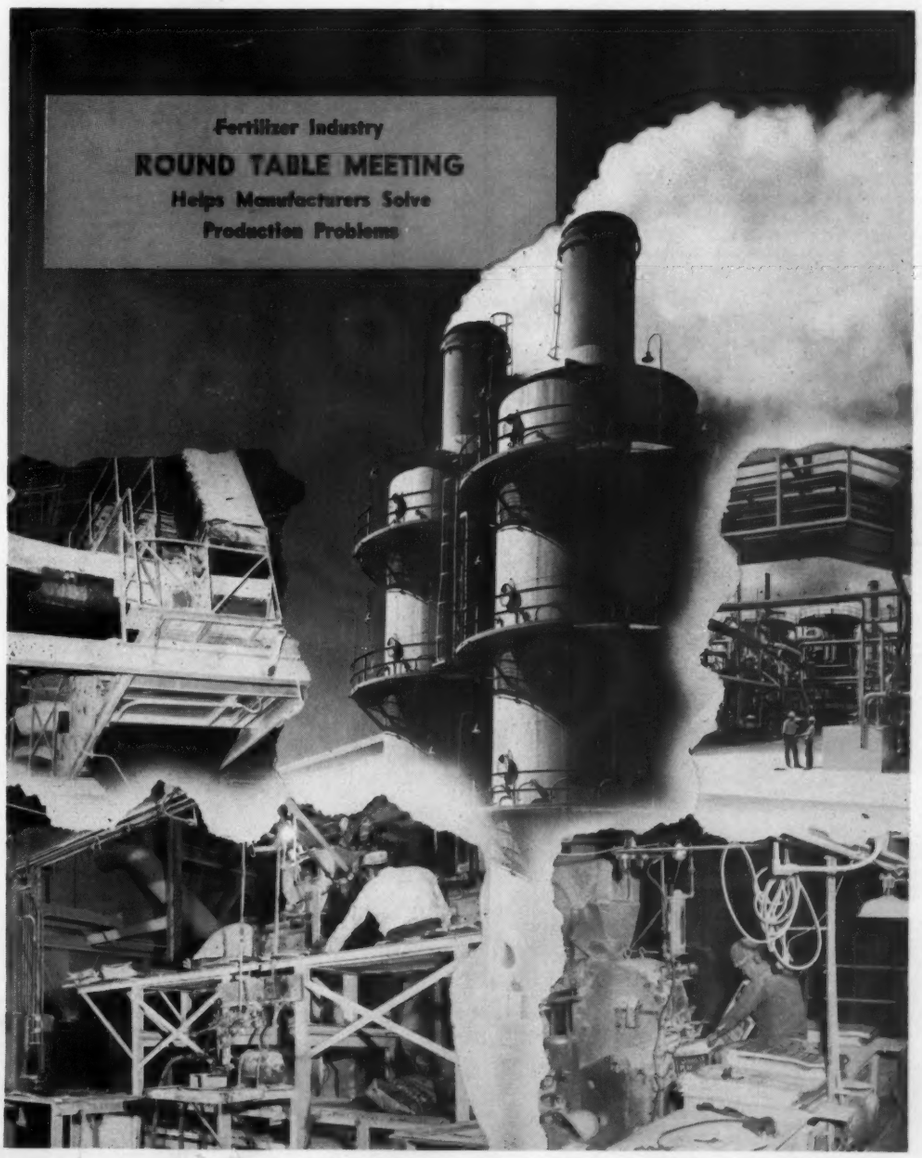
DISCUSSIONS covering materials handling of liquid and dry fertilizer products, including pneumatic systems, loading, unloading, and transportation, open the annual Fertilizer Industry Round Table meeting at the Mayflower Hotel, Washington, D.C., Nov. 8. The meeting continues through Nov. 10, according to the advance schedule.

Dr. Vincent Sauchelli, chairman of the Round Table committee, was scheduled to welcome the group at 9 a.m. Wednesday, with sessions on materials handling, plus a review on conditioning agents in mixed fertilizer, completing the morning session.

The weighing of materials and the need for accuracy was a subject for the afternoon session, along with information on unloading, at both high and low rates, of anhydrous ammonia and solutions; pressure systems and use of air and pumps in unloading.

Methods of determining the content of the car

Turn to **ROUND TABLE MEETING**, Page 26



MANY-SIDED PICTURE.—Modern fertilizer manufacturing is a complex and highly technical enterprise. Above montage of views in and around plants pictures scenes familiar to many in the trade. Production personnel gain additional information each year through attendance at the annual Fertilizer Industry Round Table meeting.

USDA Report Says . . .

Fewer Fertilizer Tons in 1960, But More Nutrients

EDITOR'S NOTE—A summary of this statistical article was included in the October issue of Croplife. We present here a more detailed account of the fertilizer consumption picture for the year ended June 30, 1960. The authors explain that quantities are reported as 2,000 lb. tons and the term "shipments" of fertilizers is used synonymously with "consumption" and "sales." The quantities, however, do not include the amounts of products used in the manufacture of commercial mixtures, the authors state.

FERTILIZER consumption in the U.S. during the year ended June 30, 1960, totaled 24,877,415 tons, according to a USDA compilation recently issued. The total comprised 23,499,286 tons of products containing one or more of the primary nutrients, and 1,378,129 tons of secondary and trace nutrient materials marketed for retail consumption. Consumption of fertilizers containing primary nutrients, the report says, was 2.4% below the 24,085,036 tons tallied in the previous year.

The quantity of secondary or trace nutrient materials, however, was 12.7% greater than the 1,223,204 tons reported in the preceding year.

Decreases in consumption of primary nutrient fertilizers occurred in 31 of the 51 U.S. areas designated in the report. The majority of these areas were the larger users of fertilizer, whereas most of the increases were registered in areas which consume relatively small tonnages.

Of the 38 areas east of the Rocky Mountain region, decreases in consumption were recorded in 26 when compared with the preceding year. In the 11 areas comprising the Mountain and Pacific regions, all but three recorded an increase in consumption.

The proportional decline in the national consumption of primary nutrient fertilizers was about evenly divided between mixtures and direct application materials. The use of mixtures decreased 2.6% and that of materials 2.1%. A wide variation, however, existed in regional and state levels. The totals range from an increase of 25% in mixtures in the Mountain region to a decrease of 18% in materials in Hawaii.

Although the national consumption of primary nutrient fertilizers in 1959-60 was lower than in the previous year, the change in consumption was not highly significant and

TABLE 1—Kinds of Fertilizer Consumed, by Region, Year Ended June 30, 1960[1]

Kind	New England	Middle Atlantic	South Atlantic	East North Central	West North Central	East South Central	West South Central	Mountain	Pacific	Alaska, Hawaii, and Puerto Rico	United States
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
MIXTURES	346,028	1,769,448	3,918,468	3,398,621	1,342,307	2,078,136	716,080	92,186	447,924	272,217	15,649,622
0-9-9	321,084	1,482,997	4,535,000	3,385,448	1,280,668	1,853,681	616,178	62,648	297,798	238,152	13,985,030
0-9	90	311	1,193	35,216	220,838	12,190	51,743	29,387	111,792	2,249	463,957
9-9	24,854	113,230	242,250	117,499	41,080	207,726	46,664	93	4,162	4,384	817,112
9-0	0	566	24,057	480	0	5,754	1,495	0	4,172	27,314	63,533
CHEMICAL NITROGEN MATERIALS	13,384	85,672	949,881	484,779	718,823	833,164	515,893	249,660	951,398	26,807	4,545,666
Ammonia, anhydrous	0	3,056	423,878	79,904	170,805	71,370	285,483	48,079	143,440	594	788,899
Ammonia, aqua	0	0	20,948	6,818	12,284	4,225	8,297	23,320	323,989	44,978	426,571
Ammonium nitrate	3,168	31,782	382,000	154,954	313,525	283,863	122,371	79,288	79,881	342	1,231,274
Ammonium nitrate-limestone mixtures	46	1,520	218,044	1,917	647	27,070	3,503	1,053	94	0	253,999
Ammonium sulfate	253	11,479	5,284	98,599	78,323	14,385	80,062	44,799	244,594	24,798	536,795
Calcium cyanamide	1,921	5,770	8,000	475	130	2,083	6,003	2,758	4,450	0	42,266
Calcium nitrate	0	0	5,544	30	0	3790	0	10,005	29,040	591	48,728
Nitrogen solutions	1,705	2,000	170,819	112,802	139,844	28,152	36,170	14,464	79,067	0	650,859
Sodium nitrate	4,291	31,802	21,191	1,830	424	139,938	54,851	1,965	377	130	456,341
Urea	1,246	2,071	4,000	25,910	3,407	4,884	30,935	19,127	37,854	6,892	142,198
Other	1,905	4,491	2,534	19,450	2,784	5,363	1,257	2,858	6,823	1,751	49,996
NATURAL ORGANIC MATERIALS	18,015	36,401	31,639	41,271	19,335	7,355	7,152	7,754	329,530	132	498,684
Blood, dried	3	31	37	0	0	0	0	22	2,000	0	2,186
Castor pomace	668	293	3,282	0	0	0	0	0	3,530	0	7,771
Compost	1	3,639	21	4,388	9,738	38	2,538	824	0	0	21,428
Cottonseed meal	1,899	888	1,668	91	0	0	0	0	0	0	3,814
Fish scrap, meal, emulsions	238	86	1	0	0	0	0	0	1,324	0	1,721
Manures, dried	6,896	11,836	6,830	7,838	3,647	1,039	2,780	1,745	273,640	0	315,224
Sewage sludge, activated	5,871	15,543	10,624	24,048	6,820	1,895	1,844	3,798	17,281	93	87,998
Sewage sludge, other	0	0	11	1,754	146	13	0	988	29,923	12	32,776
Tankage, all	1,060	3,387	3,599	640	30	183	0	77	827	25	10,230
Other	273	668	3,522	0	2	0	0	475	1,141	0	6,212
PHOSPHATE MATERIALS	38,075	91,933	87,917	442,374	517,040	193,880	247,343	211,091	311,532	14,384	2,339,329
Ammonium phosphate: 11-48	1	2,663	110	17,370	12,190	2	4,733	15,802	22,537	1,766	116,383
Ammonium phosphate: 13-39	0	2	0	97	22,705	17	18,344	4,212	5,908	0	51,284
Ammonium phosphate sulfate: 16-20	0	0	0	1,212	101,020	96	97,159	60,388	117,499	504	378,370
Ammonium phosphate nitrate: 27-14	0	0	69	125	7,397	3,297	0	5,940	7,945	0	24,778
Basic slag	0	0	12,577	0	0	57,911	2,393	0	0	0	72,879
Bonemeal: raw and steamed	1,175	3,080	1,987	1,253	237	353	0	36	1,780	207	10,213
Calcium metaphosphate	2	450	1,350	4,849	12,178	11,231	200	184	51	0	30,571
Diammonium phosphate: 21-53	3	110	661	4,528	7,373	2,972	1,003	10,382	3,108	837	30,881
Phosphoric acid	0	38	0	391	37	0	4,674	12,486	14,559	0	32,182
Phosphate rock	686	7,383	25,361	678,510	123,095	11,855	20,338	40	429	3,298	661,584
Colloidal phosphate	0	0	1,919	780	0	1,340	1,983	50	80	0	11,939
Superphosphate: 18%	1,061	6,117	15,183	3,733	9,180	19,474	0	0	2,171	479	59,398
" 16%	3,251	11,356	1,543	2,234	0	93	0	3,441	1,284	0	21,102
" 20-22%	23,748	59,838	89,683	44,834	31,432	88,731	90,257	17,643	103,083	424	428,312
" 23-46%	0	0	76	2,323	899	2,748	595	0	784	5,038	12,429
" 45%	0	1,884	859	19,364	41,897	7,396	4,414	64,130	19,912	0	159,856
" 48%	61	1,757	1,494	57,382	101,878	4,788	29,230	15,066	1,255	1,496	226,399
" 47-0-0	2	10	139	4,681	2,480	909	134	1,294	61	0	10,780
Other	288	0	896	3,799	0	0	19	0	2,238	519	7,951
POTASH MATERIALS	2,041	9,633	76,888	201,780	43,085	44,288	40,418	2,297	15,909	9,989	476,325
Low-potash mixtures[2]	0	67	18,211	0	6	0	8,473	0	0	0	26,733
Manure salts	0	0	282	0	0	0	1,221	0	0	0	1,510
Potassium chloride: 50-60%	1,161	6,189	23,590	199,612	40,367	30,601	38,007	715	8,545	6,612	305,309
" magnesium sulfate	20	1,338	2,891	2,980	300	1,590	90	665	790	105	10,281
" nitrate	99	13	123	0	0	0	0	0	0	0	243
" sodium nitrate[3]	0	217	15,438	230	0	1,840	991	0	0	0	18,542
" sulfate	191	1,589	4,289	2,948	2,921	6,127	130	1,121	6,623	1,059	26,798
Other	579	90	1,781	93	91	0	0	0	151	203	3,089
SECONDARY AND TRACE NUTRIENT MATERIALS	440	5,011	100,872	5,480	1,388	4,738	3,499	28,491	1,218,527	3,193	1,378,129
Aluminum sulfate[4]	0	8	15	38	1	0	0	0	79	0	121
Borax[4]	182	173	480	483	87	300	7	0	484	0	2,321
Calcium sulfate (gypsum)	241	1,024	104,301	3,311	948	4,227	1,195	20,988	1,162,383	0	1,296,755
Copper sulfate[4]	0	4,077	303	43	4	0	0	0	156	0	4,580
Iron sulfate[4]	0	10	103	3	0	6	3	234	2,006	2,043	6,176
Magnesium sulfate[4]	22	240	543	292	22	15	1	19	140	224	1,228
Manganese sulfate[4]	3	139	184	186	5	0	0	0	49	0	526
Mixed minerals[4]	1	25	721	1,067	132	1	84	725	3,724	0	6,460
Sulfur: 25-99% S	4	14	532	14	21	7	971	1,638	28,458	0	31,712
Sulfuric acid: 48-93%	0	0	0	0	0	0	1,258	1,571	1,203	0	4,032
Zinc sulfate[4]	0	8	467	16	61	120	0	63	3,180	115	4,000
Other	0	33	0	2,010	0	0	0	3,633	16,088	11	19,597
GRAND TOTAL	409,042	1,988,099	9,150,317	4,784,260	2,867,458	2,980,673	1,528,385	589,379	3,263,220	326,257	24,877,415

1/ Includes the following fertilizers distributed by Government agencies for test demonstrations: - to mixtures, 11-33-0 grade 100 tons, 15-33-15 grade 172 tons, 20-10-0 grade 1,838 tons; to materials, calcium metaphosphate 4,231 tons, diammonium phosphate (21-53-0, 20-52-0) 3,789 tons, nitrogen solutions (38%) 2 tons, and superphosphate (54%) 618 tons. Excludes mixing materials and the quantities of materials used in the manufacture of commercial mixtures. 2/ Undetermined quantities may have been used for non-fertilizer purposes. 3/ Distributed by manufacturers of fertilizers. 4/ Includes an estimate of 750,000 tons consumed in California. 5/ Includes all reported quantities of the grade. 6/ Additional quantities are given free to farmers for which no records are kept. 7/ Additional quantities may have been reported by grade under mixtures.

TABLE 2—Fertilizer Consumed as Mixtures and as Direct-Application Materials, Year Ended June 30, 1960, and Comparison with Preceding Year

State and region		Mixtures			Materials[1/]			Grand total	Comparison with total consumption in year ended June 30, 1959	
		July 1 - Dec. 31, 1959	Jan. 1 - June 30, 1960	Total	July 1 - Dec. 31, 1959	Jan. 1 - June 30, 1960	Total		Fertilizer[2/]	N, avail. P_2O_5, and K_2O
		Tons	Tons	Tons	Tons	Tons	Tons	Tons	Percent	Percent
Maine		13,735	138,381	152,116	2,591	5,646	8,237	160,353	89	98
New Hampshire		2,564	11,613	14,177	1,248	2,831	4,100	18,277	87	88
Vermont		5,945	35,215	41,160	14,005	3,951	17,956	59,116	107	108
Massachusetts		13,571	54,550	68,121	4,043	11,103	15,146	83,267	92	95
Rhode Island		1,596	13,108	14,704	682	1,276	1,958	16,662	98	98
Connecticut		9,216	46,534	55,750	6,883	11,384	18,267	73,017	91	96
New England		46,627	299,401	346,028	27,183	30,251	63,434	409,462	93	94
New York		122,206	396,950	517,156	24,310	50,629	75,139	592,295	95	98
New Jersey		46,759	167,108	213,867	7,495	15,779	23,274	237,141	93	92
Pennsylvania		173,903	412,465	586,368	24,570	57,309	81,879	668,247	108	101
Delaware		14,392	71,612	86,004	879	4,070	4,949	90,953	95	96
District of Columbia		1,591	2,492	4,083	830	500	1,330	5,413	110	105
Maryland		63,489	214,682	278,171	5,753	15,638	21,391	299,562	96	98
West Virginia		12,154	51,665	63,819	1,397	8,282	11,569	75,388	99	100
Middle Atlantic		434,494	1,316,974	1,749,468	67,364	152,187	219,551	1,968,999	97	98
Virginia		128,154	518,360	646,514	18,465	84,655	103,120	749,634	94	98
North Carolina		154,665	1,129,884	1,284,529	35,549	282,835	318,384	1,602,913	92	91
South Carolina		77,605	500,800	578,405	27,281	178,277	205,558	783,963	88	90
Georgia		198,097	931,254	1,129,351	52,695	273,207	325,902	1,455,253	99	100
Florida		528,912	850,749	1,379,661	56,790	122,123	178,913	1,558,574	106	106
South Atlantic		1,087,433	3,931,027	5,018,460	190,780	941,097	1,131,857	6,150,317	96	97
Ohio		267,071	698,077	965,148	25,351	98,249	121,600	1,086,748	99	102
Indiana		285,146	612,750	877,896	61,701	212,653	274,354	1,152,250	98	100
Illinois		170,675	428,864	599,539	414,425	638,600	852,825	1,452,364	91	93
Michigan		225,624	360,863	586,287	21,980	82,196	84,184	670,471	91	93
Wisconsin		55,512	314,459	369,971	10,827	41,854	52,681	422,652	86	91
East North Central		983,628	2,414,993	3,398,621	534,292	851,352	1,385,644	4,784,265	94	97
Minnesota		84,427	308,735	393,162	38,263	107,045	145,288	538,450	98	97
Iowa		63,180	376,793	439,953	46,329	184,210	230,539	670,492	99	102
Missouri		180,565	330,362	503,927	109,467	189,952	298,419	802,346	86	99
North Dakota		13,767	36,185	49,952	29,418	66,607	96,025	145,977	109	111
South Dakota		1,983	10,543	12,526	5,732	17,840	23,572	36,098	93	94
Nebraska		9,300	40,187	49,487	87,680	204,459	292,139	341,953	104	104
Kansas		69,349	44,043	113,392	114,551	106,018	220,569	333,961	115	119
West North Central		410,759	1,151,828	1,562,587	431,540	873,331	1,304,871	2,867,458	97	103
Kentucky		76,637	385,363	462,000	30,642	76,745	107,387	569,387	95	98
Tennessee		95,763	394,868	490,631	32,692	100,716	133,408	624,039	104	104
Alabama		130,375	665,592	803,967	48,643	221,123	269,766	1,073,733	108	113
Mississippi		27,928	293,605	321,533	118,132	233,849	371,981	693,514	99	105
East South Central		330,703	1,739,428	2,078,131	230,109	652,433	882,542	2,960,673	99	104
Arkansas		20,207	153,563	173,770	39,455	152,178	190,833	364,603	101	104
Louisiana		38,794	127,173	164,537	33,648	111,363	145,011	309,548	106	109
Oklahoma		33,882	43,828	77,690	38,827	28,826	67,653	145,343	109	116
Texas		83,549	232,536	298,083	148,193	282,615	410,808	708,891	107	111
West South Central		176,382	537,698	714,080	259,323	554,982	814,305	1,528,385	105	109
Montana		486	3,512	3,998	13,653	27,077	40,730	44,728	109	111
Idaho		3,746	15,325	19,073	28,589	101,951	130,540	149,513	109	118
Wyoming		293	832	1,125	2,293	14,761	17,054	18,179	115	117
Colorado		3,844	15,069	18,933	21,870	55,457	77,327	96,260	111	115
New Mexico		730	3,281	4,011	8,172	33,971	42,143	46,154	112	116
Arizona		10,534	26,284	36,844	52,391	98,371	150,782	187,606	94	98
Utah		1,719	6,381	8,100	4,728	29,588	34,256	42,356	115	110
Nevada		629	1,393	2,022	1,108	2,455	3,563	5,585	94	107
Mountain		22,067	70,059	92,126	132,604	363,649	496,253	588,379	105	109
Washington		13,611	39,829	53,440	80,898	144,148	225,046	276,486	114	114
Oregon		7,000	22,550	29,550	41,503	127,840	169,143	198,693	99	100
California		107,382	169,552	336,934	1,163,365	1,267,742	2,431,107	2,768,041	101	104
Pacific		125,993	291,931	417,924	1,285,766	1,539,730	2,825,296	3,243,220	102	105
48 States and D. C.		3,626,066	11,753,339	15,377,405	3,158,921	5,944,832	9,123,753	24,501,158	98	101
Alaska		0	1,850	1,850	0	2,469	2,469	4,319	---	---
Hawaii		32,131	25,775	57,906	35,036	34,315	69,349	127,255	92	96
Puerto Rico		91,945	129,516	212,461	14,711	17,311	32,222	244,683	95	93
United States	1959-60	3,750,142	11,899,480	15,649,622	3/3,208,666	4/6,019,127	9,227,793	24,877,415	98	101
	1958-59	3,794,680	12,276,347	16,069,027	3/3,276,656	4/5,962,357	9,239,213	25,308,240	100	100
	1957-58	3,620,837	10,932,186	14,353,023	2,994,876	5,168,046	8,162,760	22,515,783	90	98

1/ Includes the primary nutrient (N, P_2O_5, K_2O) and the secondary and trace nutrient materials. 2/ Guaranteed to contain one or more of the primary nutrients. 3/ Revised: 8 tons was subtracted from the South Carolina total. 4/ Revised: 4,424 tons was subtracted from the South Carolina total.

TABLE 3—Principal Primary-Nutrient Ratios of Mixtures Consumed, U.S., Year Ended June 30, 1960*

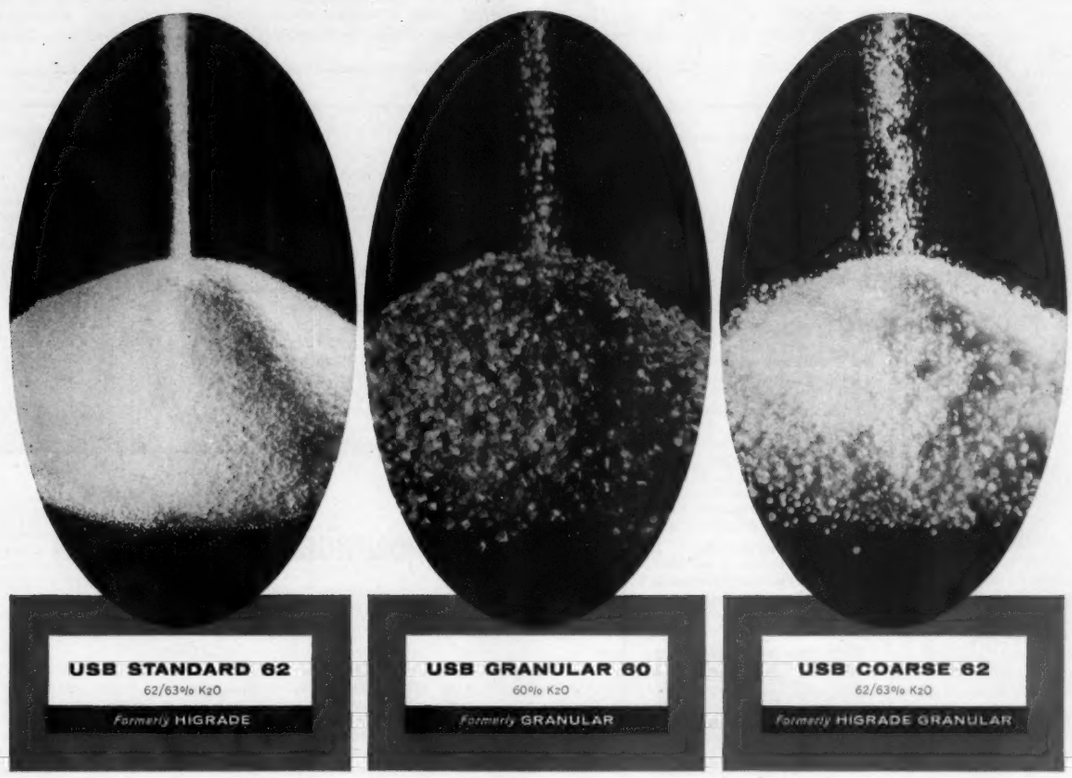
Primary-nutrient ratio†	Consumption	Proportion of total	Primary-nutrient ratio†	Consumption	Proportion of total
	tons	%		tons	%
1:2:2	2,415,159	15.99	4:7:5	88,063	.59
1:1:1	2,132,804	14.12	2:3:3	85,340	.56
1:4:4	2,037,233	13.49	3:2:2	78,088	.52
1:3:3	1,641,802	10.87	3:2:4	74,055	.49
1:2:1	713,663	4.72	2:5:3	72,766	.48
1:2:3	627,462	4.16	2:1:2	71,913	.48
1:4:2	569,455	3.77	2:2:1	69,584	.46
0:1:1	511,569	3.38	1:1:0	67,419	.44
3:4:4	272,480	1.81	1:3:9	64,579	.43
1:6:6	268,971	1.78	1:4:0	62,958	.42
4:10:7	244,990	1.62	1:2:0	62,260	.41
1:0:1	154,502	1.02	1:3:4	61,121	.40
0:1:2	145,572	.97	0:2:1	56,372	.38
1:3:2	140,604	.93	3:5:2	55,145	.36
1:3:1	139,636	.93	4:9:3	54,130	.36
2:1:1	139,455	.93	2:4:3	50,238	.33
1:3:0	116,308	.77			
3:4:3	103,426	.68	Sub-total	13,733,230	90.93
5:3:2	96,128	.64	Other‡	1,369,991	9.07
1:3:6	95,676	.63			
0:1:3	92,304	.61	Total**	15,103,221	100.00

*Excludes Alaska, Hawaii and Puerto Rico. †N:available P_2O_5:K_2O. Consumed in amounts of 50,000 tons or more. ‡All other ratios of mixtures reported by grade. **Excludes mixtures not reported by grade.

TABLE 4—Change in Consumption from Preceding Year of Classes of Direct Application Fertilizer Materials, by Region, Year Ended June 30, 1960

Region	Increase or decrease (—)							
	Chemical nitrogen materials		Natural organic materials		—Phosphate— materials		—Potash— materials	
	tons	%	tons	%	tons	%	tons	%
New England	416	3.5	—8,202	—32.8	3,038	10.5	—630	—23.6
Middle Atlantic ...	7,448	9.5	—4,257	—10.4	—2,301	—2.7	193	2.1
South Atlantic	—52,142	—5.9	156	.5	—16,448	—15.8	—9,177	—10.7
E. North Central ..	1,372	.3	—10,457	—20.2	—57,034	—8.2	—4,900	—2.4
W. North Central..	31,468	4.6	—951	—4.9	—114,770	—18.2	—2,354	—4.5
E. South Central ..	34,059	5.9	—273	—9.6	—52,784	—21.4	2,246	3.5
W. South Central..	42,467	9.0	297	4.3	12,013	5.1	1,337	3.4
Mountain	—6,398	—2.5	1,839	31.1	15,203	7.8	—529	—18.7
Pacific	—530	—0.1	—4,615	—1.4	41,416	15.3	674	4.4
Other	—9,054	—10.8	—21	—13.7	—3,380	—19.8	—3,238	—24.9
U. S.	49,106	1.1	—26,484	—5.1	—175,047	—7.0	—16,378	—3.3

3 types of POTASH specially sized for you...



To make the best fertilizers...

Each of our three types of high quality muriate of potash is ideally sized to meet your particular manufacturing requirements. Both of the white grades – STANDARD and COARSE – contain the highest possible K_2O (62/63%) and make feasible the manufacture of the highest analysis mixtures. Our GRANULAR 60 is ideally suited for mixtures requiring muriate of a larger particle size... or for direct application. All three products are refined to assure free-flowing and non-caking properties during handling and storage.

For nearly thirty years our products and services have kept pace with your exacting needs. Call, telex or wire one of our nearby offices for prompt delivery.

ATLANTA
1627 Peachtree St., N.E. / TRinity 6-7515
CHICAGO
3456 Peterson Avenue / INdependence 3-6262
LOS ANGELES
630 Shatto Place / DUnkirk 7-5151

U.S. BORAX

50 ROCKEFELLER PLAZA, NEW YORK 20, N.Y. / JUDSON 2-6262

MEN MOVING AHEAD IN THE TRADE

Personnel appointments for the new $7 million Southwest Nitrate of Potash plant at Vicksburg, Miss., have been announced by **W. Aubrey Smith**, vice president. **J. S. Mitchell**, formerly plant superintendent of the company's Carlsbad, N.M., operation will be general manager of the Vicksburg plant. **J. Marshall Downey** has been named general superintendent. He joined Southwest Potash Corp. in 1952. **C. M. Gartman, Jr.**, has been named maintenance superintendent, and **Melvin B. Markel**, chief accountant.

●

Rene P. Missir has been named traffic manager of the chemical export department of the International Division of FMC Corp., formerly Food Machinery and Chemical Corp. He was formerly assistant traffic manager.

●

Julio J. Usera has joined the recently formed international division of Hooker Chemical Corp., New York, as director of sales. The announcement was made by **William D. Morrison**, general manager of the international division.

●

The promotion of **James R. Turner** to the post of assistant director of plant food chemical sales for U. S. Borax & Chemical Corp. has been announced by **J. F. Corkill**, vice president for marketing.

Mr. Turner, who joined U. S. Borax in 1952 as an agronomist, has been serving most recently as manager of plant food product development. He will now report to **John E. Fletcher**, director of plant food chemical sales.

●

Kenneth Van Duzer has joined Legreid Farm Service Co., Mason City, Iowa. He recently resigned as general manager of Ris-Van division of Armour Agricultural Co. Ris-Van's facilities are located at Belmond, Iowa. Legreid has recently extended its fertilizer operation by the addition of a new fertilizer mixing plant at Emery, Iowa. The mixing plant is 75x600 ft., and has a capacity of 30 tons an hour.

●

The appointment of **Dr. John A. King** to manager of research and development of American Cyanamid Co.'s agricultural division has been announced by **C. D. Siverd**, division general manager. Mr. King replaces **Dr. J. T. Thurston.** Before joining Cyanamid in 1960, Dr. King was director of research and general manager for the research division of Armour & Co.

●

William H. Jordan has joined Stauffer Chemical Co. as field representative, agricultural chemicals, Imperial Valley territory, California. Mr. Jordan is a graduate of Colorado State University and has had ten years' experience in pest control with the U.S. Department of Agriculture and with several chemical firms.

●

The Tennessee Valley Authority has announced the appointment of **Victor J. Kilmer** as assistant to the manager of TVA's office of agricultural and chemical development at Muscle Shoals, Ala. His duties will be to coordinate special agricultural and chemical projects, both within TVA and with other agencies and groups. Mr. Kilmer came to TVA from the Agricultural Research Service, USDA.

●

Don H. Taylor has joined Wheelabrator Corp., dust and fume control division, Mishawaka, Ind., as a regional engineer and has been assigned to a territory in northern Ohio and Michigan, including the cities of Cleveland and Detroit. His headquarters are at Wheelabrator's regional office in Cleveland.

●

Henry M. Coleman, Jr., has been appointed to the staff of Vulcan Steel Container Co., Birmingham, Ala., as representative for the Mississippi and Louisiana territory, according to an announcement by **Gordon D. Zuck**, president.

Frank J. Valenti, former sales manager of Trans-Weigh Co., has been named general sales manager of Weighing & Controls, Inc., subsidiary of CompuDyne Corp. following purchase of Trans-Weigh by CompuDyne Corp.

●

Patrick L. McManus has been appointed general manager of Worthington Corporation's Standard Pump Division at East Orange, N.J. He was formerly director of marketing services at the company's headquarters in Harrison, N.J.

●

Geigy Agricultural Chemicals, Division of Geigy Chemical Corp., Ardsley, N.Y., has announced the appointment of **John Clack** as district sales manager to the newly-created Mississippi Delta sales area. Mr. Clack, a native of Waco, Texas, has served as salesman for Geigy since 1957. He will be in charge of sales and service to distributors and users of the company's line of herbicides and other agricultural chemicals. Mr. Clack's headquarters will be Greenville, Miss.

John Clack

NUMBER 3 IN A SERIES OF 3 REPORTS

FILLING THE NEED FOR PHOSPHORUS

American Cyanamid Company completes the phosphorus story with facts about the need for—and the results of—phosphate fertilization

The October and November reports† explained why phosphorus is an indispensable plant food; phosphorus fixation and how to make it work for you; why yearly phosphorus fertilization is needed by most crops.

This final report locates areas of phosphate deficiency and shows how crops respond to phosphate fertilization.

We're using up the phosphate reserves in our soils

Each year an average of about 3 lbs. of phosphorus is removed from U.S. soils for each 2 lbs. returned.

In order to know how much phosphorus your soils need, you must know how much they have. Soil testing is the way to find out.

This deficit is consistently greater in some soils. For example, most pastures receive only a fraction of the phosphorus they need . . . if they get any at all. On the other hand, intensively cultivated crops such as vegetables, tobacco, and potatoes, get more than they can use. This over-ferti crops over ma a surprising r phosphate ferti other crops! A can explain thi

How phospho get the

Early America ing virgin soils

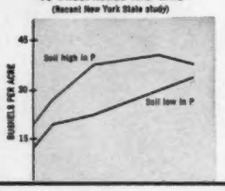
†If you missed these re

phosphorus, soon learned that phosphate fertilization increased yields. By 1900, phosphates had become the major fertilizer used.

After decades of fertilization and cropping, many—*but not all* trated in the top few inches of soil. This encourages shallow rooting and retarded growth in dry years. Efficient production demands adequate available phosphorus *throughout* the root

never seen a pound of phosphate fertilizer. Forage crops respond as much as cash crops, and often give a greater return per dollar invested in phosphorus, other plant nutrients, and lime.

HOW GRAIN RESPONDS TO PHOSPHORUS AND LIME
(Recent New York State study)



phosphorus is "fi soils after applica lizer. But, when erly managed, fix can be made avail Thus, like money phosphorus in the ...but can be relea increased income capital investment

Where do we go

Production is grow efficient through c all phases of agri crop varieties, i management, etc chain is no stro weakest link. Eff ited by the *weakes*

NUMBER 2 IN A SERIES OF 3 REPORTS...

PHOSPHORUS FERTILIZATION

American Cyanamid Company presents facts which will help you with phosphate fertilization

Last month's report† explained why phosphorus is the "indispensable" plant food; why only a small part of the phosphorus in your soil is usable by crops as plant food; how phosphorus quickly becomes "tied up" or "fixed" by forming compounds from which phosphorus is unavailable to most plants; and what you can do to make the phosphorus in your soil more available to your crops.

The present report discusses phosphate fertilization — when and how to apply phosphate fertilizers.

ply is used *during the year of application.*) As total phosphorus in the soil increases, so does the amount that is available to your crops . . . *if you manage your soil properly.* Eventually, enough phosphorus can accumulate so that the amount converted from the fixed forms will be enough to supply a good share of the annual crop needs. Where, before, larger amounts of phosphorus fertilizers had to be applied to get enough available phosphorus to crops, now smaller amounts will do, because much of the phosphorus requirement will come

tration of available phosphorus to get crops off to a good start. Later, when root systems are better developed and able to absorb more phosphorus, the crops will be able to get enough phosphorus from these well-supplied soils.

Timing and placement of phosphorus fertilizers

Phosphorus fertilizers are applied to increase *available* phosphorus for the coming crop and to build up the total phosphorus in soils with low phosphorus reserves.

Available phosphorus is quickly fixed in many soils. In

tilizers *in band* ing the fertili phosphorus is n as when mixed Also, crop root phorus more q of the fertiliz the young pla placement is n acid and other low in phospho

On the othe stay in for tw must have th supplied by t phosphates to surface of the inch or two of t move into the fore, for hay such as alfalfa it is important amounts of ph *them into the soil* when the pared. This ext

NUMBER 1 IN A SERIES OF 3 ARTICLES...

PHOSPHORUS...

American Cyanamid Company explains the problem of getting enough of this indispensable plant food ... and what to do about it

Every crop needs nitrogen, phosphorus, potassium, and other elements. Each crop needs these elements in a certain proportion. Different soils supply differing amounts of these plant foods. Therefore, the amount to be supplied by fertilizer will vary, depending on soil type, the amount of plant food already in the soil, and other factors. That's why fertilizer manufacturers offer such a wide range of mixed fertilizers. American Cyanamid Company believes the best way to get the most from your fertilizer program is to understand each plant food . . . what it does and how to use it.

Numbers tell percentages of nitrogen, phosphorus (P_2O_5), potash (K_2O) in mixed fertilizer. The ratio depends on crop need and amount of nutrient in soil. Article discusses problem of phosphorus fertilization.

This is the first of three articles† in which Cyanamid presents

has a different job and a deficiency of each produces its own special symptoms.

When plants don't get enough phosphorus, growth slows; roots are stunted and not properly branched; blossoms, fruits and seeds don't develop properly. Yields are low, and often maturity is delayed.

In livestock, phosphorus is part of many body processes, such as conversion of feed to energy and formation of strong bones and teeth. Animals on phosphate-deficient feed and forage develop depraved appetites (they will actually chew bones), and will dissolve phosphorus from their own bones to supply enough for other body functions.

Purpling of leaf edges reveals serious phosphorus deficiency. Growth and fruiting are slowed, yields cut long before these symptoms show up.

plants can't take up sufficient nitrogen or potash for high yields.

Another way in which phosphorus increases availability of nitrogen is in legumes. Legumes take free nitrogen from the air and convert it to plant food . . . if they are first supplied sufficient phosphorus!

Why phosphorus fertilization is a problem

There's an average of 1000 lbs. of

Plant roots take up most of nutrients from the soil solu *That means most plant foo tering the roots must be diss in soil water.* Yet, over 99% phosphorus in the soil is *inso* in water. It is part of many plex compounds and has be "tied up" or unavailabl plants. Soil scientists call process "phosphate fixat Less than 1% is phosphorus is readily available to plant

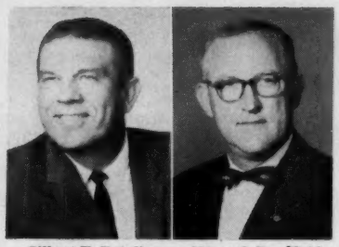
How phosphorus is "tied

Phosphorus is a very "active ment. That's why it's nev pure form in nature, and w so quickly forms many co compounds with other ele in the soil. If you handle fertilizer and soil building gram properly, you can act make available more of the phorus "tied up" in the s applied in fertilizers. If you handle soils and fertilizers can speed phosphorus fixa While you can legitimately sider "tied up" phosphor "stored" in the soil, it c released only by proper ma ment.

What to do to make mo phosphorus available

Here are some of the thing can do to make available of the phosphorus you al have . . . and that which yo in fertilizers.

Liming — A most importan



Gilbert E. Betulius Kenneth Bradfield

Gilbert E. Betulius has been named general manager of the Sprayer Division of Hahn, Inc., Evansville, Ind., according to an announcement by **Lloyd Hahn,** president. Mr. Betulius was sales manager since 1950 and a member of the Hahn board of directors since 1956.

Kenneth Bradfield, formerly technical service manager and assistant sales manager, was named marketing manager for the firm. In other shifts **Louis Carroll** was named sales promotion manager; **Norm Pfieffer,** sales engineer; **Walter Schnautz,** manager of product engineering; **James Obermeyer,** design engineer, and **Jim Niemeier,** technical service manager.

●

The election of **Richard G. Henninger** as treasurer of Hazleton Laboratories, Inc., to fill the position left vacant by the resignation of **Francis E. Miller,** was announced recently by **Dr. Lloyd W. Hazleton,** president of the laboratories. Mr. Henninger has been a director of Hazleton Laboratories since July 6, 1955. He also holds the position of assistant to the president.

●

Appointment of **Paul A. Fodor, Jr.,** as director of sales for the chemical division of Pittsburgh Plate Glass Co., Pittsburgh, has been announced by **Chris F. Bingham,** vice president, sales-chemical division. Mr. Fodor, formerly assistant director of sales, succeeds **W. F. Newton,** recently appointed director, marketing planning, for the company's merchandising division.

●

Richard C. Wells and **Thomas R. Vaughan** have been elected members of the board of directors of Freeport Sulphur Co., **Langbourne M. Williams,** chairman, announced recently. Mr. Wells is executive vice president of the company and chairman of National Potash Co., which Freeport owns jointly with Consolidation Coal Co. Mr. Vaughan is vice president and general counsel for Freeport.

●

Towmotor Corp., Cleveland, Ohio, has announced the election of **Galen Miller** as president. **Robert L. Fairbank** succeeds Mr. Miller as executive vice president, and **C. Edgar Smith,** president since 1951, assumes the newly-created post of chairman of the executive committee of the board. The announcements were made by **Lester M. Sears,** chairman and founder of the company.

Three other promotions have also been announced by Towmotor:

Daniel M. Wessman, formerly assistant sales manager, becomes assistant to the executive vice president; **Alfred H. Roth** was named manager of marketing and advertising, and **W. L. Utley** becomes assistant to the president in addition to his current post as assistant secretary.

●

Esper K. Chandler has joined The Best Fertilizer Co. of Texas at Houston, **Russell C. Dellinger,** president, has announced. Mr. Chandler was formerly district agronomist for the National Plant Food Institute, stationed at Shreveport, La. In his new position, he will work with professional and college educational and research personnel, and will engage in sales promotional and educational work with Best Fertilizer dealers and their farmer customers.

Esper K. Chandler

●

Appointment of **S. L. Myers** as vice president of Highway Equipment Co. was announced by **C. H. Jordan,** president. Mr. Myers will assist the executive vice president in the general administrative responsibilities of the company. In addition, he will continue to direct the export activities of Highway Equipment Co. in the capacity of export manager. Mr. Myers joined the company earlier this year.

●

Dr. J. E. Johnson J. W. Britton

Dr. Julius E. Johnson, director of agricultural chemicals research for The Dow Chemical Co., has been named manager of the company's agricultural chemicals department, according to **Herbert D. Doan,** executive vice president. Mr. Johnson's promotion was effective Oct. 16.

Mr. Johnson succeeds **J. W. Britton** who has headed Dow's agricultural operations since 1949. For the next year he will serve on special assignment in executive research. During this period Mr. Britton will report to **Dr. R. H. Boundy,** director of research.

●

Wallace E. Gordon, assistant general manager of Du Pont's industrial and biochemicals department, was appointed general manager in October to succeed **Clark W. Davis,** who retired at the end of the month after a career of more than 44 years with Du Pont.

At the same time **Benjamin F. Schlimme,** planning manager of the department, was named assistant general manager to succeed Mr. Gordon. The industrial and biochemicals department produces the company's agricultural chemicals and industrial chemicals.

●

James Kuse has been made director of market development by Hodag Chemical Corp., Skokie, Ill., it was announced by **Sheldon E. Kent,** president. Mr. Kuse will be responsible for investigating new markets for the company's products, and will also aid the sales department in marketing new products.

●

Personnel shifts announced recent-

Turn to MEN MOVING page 23

Local and regional fertilizer manufacturers are linked to this program by a listing in the last column of each advertisement. These advertisements will be put into booklet form, and made available for distribution by manufacturers and dealers. If you wish a supply, please write for details.

A FERTILIZER PROMOTION PROGRAM OF MAJOR IMPORTANCE TO THE INDUSTRY

In these three advertisements—appearing in *Farm Journal* and *Progressive Farmer*—American Cyanamid Company sets forth the role of phosphorus, and explains how best to handle soils and fertilizers for adequate phosphorus nutrition.

As a major producer of phosphates for fertilizer, we're mindful of two important facts: *One*—the prosperity of the entire agricultural community, including its suppliers, depends on how well America's land is farmed; *Two*—America's phosphate reserves are *not* inexhaustible. Cyanamid hopes these reports will contribute to both *sufficient* and *efficient* use of phosphates in a well-balanced fertilizer program. The advertisements are summed up this way: "Use enough pounds of fertilizer... and get the most from every pound you use."

We believe that only *methodical effort* to increase general understanding of fertilizers can bring total fertilizer usage up to *recommended* levels.

American Cyanamid Company, Agricultural Division, Princeton, New Jersey.

CYANAMID

PHOSPHATE PRODUCTS

CYANAMID SERVES THE MAN WHO MAKES A BUSINESS OF AGRICULTURE

600 Attend National Fertilizer Solutions Meet for Marketing, Technical Information

By LAWRENCE A. LONG
Editor of Croplife

Edward O'Nan, Land O'Nan Warehouse, Sturgis, Ky., was elected president of the National Fertilizer Solutions Assn. at the group's annual meeting at the Edgewater Beach Hotel, Chicago, Nov. 1. Mr. O'Nan succeeds Donald J. Humphrey, Flo-Lizer, Inc., Kingston, Ohio, as president. The group also named Dr. John L. Strauss, Ris-Van, Inc., Belmond, Iowa, vice president; Rhoton Cross, Farmers' Elevator, Oakville, Ind., treasurer, and Thomas Cochrane, Crookston Liquid Fertilizer Co., Crookston, Minn., secretary of the association. W. Harold Schelm, Peoria, Ill., will remain executive secretary of NFSA.

A record crowd of more than 600 was on hand to hear talks on sales and service responsibilities of the industry; a technical discussion on the future of suspension fertilizers by A. V. Slack, Tennessee Valley Authority, Wilson Dam, Ala.; an inspirational presentation by J. D. Sykes, Ralston Purina Co., St. Louis, Mo.; an entertaining philosophic discussion by Dr. G. Herbert True, South Bend, Ind., on "The Care and Feeding of Ideas"; and a marketing discussion by Drs. George M. Beal and Joe M. Bohlen, Iowa State University. Frank W. Lovejoy, Socony Mobil Oil Co., was speaker at the annual banquet held Wednesday evening, Nov. 1.

Honored by the NFSA with various awards were three persons at the banquet session. Wayne R. Johnson, Shenandoah, Iowa, was presented the "Man of the Year" award; Archie Slack, TVA, was made an honorary member of the association, and Donald J. Humphrey, immediate past president, was given an honorary plaque, first of its kind to be awarded by the association.

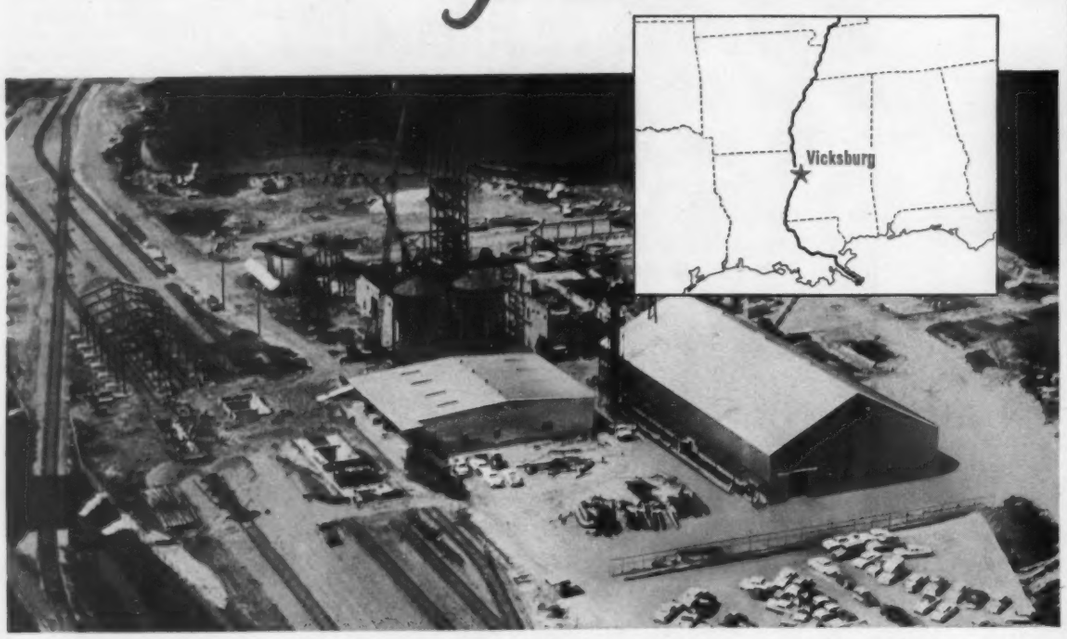
Mr. Johnson's award was presented by Richard Cecil, Cecil Fertilizers, Sorgho, Ky., and Mr. Slack's award was made by Earnest Harper, Aylco Chemical Co., Sullivan, Ill.

Two panel discussions on "Aids to Future Sales" were moderated by Dr. J. L. Strauss, Ris-Van, Inc., Belmond, Iowa, to cover different phases of marketing. Participating in the first panel were Herb Day, Stauffer Chemical Co., Omaha, Neb., who discussed insecticides; Clark Sumner, A. R. Maas Division, Southgate, Cal., trace elements; Earl C. Spurrier, Monsanto Chemical Co., St. Louis, Mo., pesticides; and Ellery L. Knake, University of Illinois, Urbana, Ill. herbicides.

The other panel discussed side dressing. Panel members included L. T. Stone, Goodpasture Grain & Milling Co., Brownfield, Texas; Jim Merriman, Merriman Fertilizers, Monticello, Ill.; George P. Lippincott, Dorchester Fertilizer Co., Cambridge, Md.; and W. A. Senesac, Senesac Fertilizers, Inc., Fowler, Ind.

The 1962 meeting will be held in Miami Beach, Fla., in November, it was announced.

Coming Soon...



Aerial view of the new Vicksburg plant of Southwest Potash Corporation—now under construction.

- EXTRA advantages for fertilizer manufacturers, formulators, mixers.
- EXTRA quality in the product you buy.
- EXTRA quality in the product you sell.
- EXTRA sources of profit for you.

HIGH-K

SOUTHWEST POTASH CORPORATION
1270 Avenue of the Americas • New York 20, N.Y.

Chemical Industry May Hit $30 Billion Sales Next Year

Chemical industry sales will reach a record high of more than $30 billion in 1962, according to Chris F. Bingham, vice president, chemical sales, chemical division of Pittsburgh Plate Glass Co.

In a recent New York address before the National Industrial Conference Board, Mr. Bingham reported that chemical industry sales for 1960 were $27.7 billion and that sales estimates for 1961 exceed $29 billion. He forecast that sales during 1962 would increase at the rate of 3% to 6% to move the industry past the $30 billion mark.

Mr. Bingham said that three principal reasons why the industry would be compelled to expand are the rapidly increasing world population; improving standard of living the world over; and the gradual depletion of the nation's natural resources. As an example, he said quantities of chemical fertilizer will be required to sustain sufficient soil fertility required to produce food for the increasing population.

Pesticide Warehouse Hit By Explosion and Fire

A series of explosions destroyed a Central Chemical Corp. warehouse near Bridgeville, Del., Sept. 21. John L. Coyle, plant manager, said the warehouse contained insecticides, fungicides and herbicides.

The blaze was discovered around 10:30 a.m., about an hour after employees had been loading the warehouse with materials for winter storage. It was at first feared that fumes from exploding drums would spread to Bridgeville. Intermittent explosions ripped the roof off the warehouse, and flames soared high in the air, Mr. Coyle said.

Home offices of Central Chemical are in Hagerstown, Md.

STOP FIRES BEFORE THEY BEGIN

Here are some rules, general and specific, for the prevention of possible fires in the plant, as outlined by E. A. Wecker, superintendent of the Dow Chemical Co. fire department:

1. Practice good housekeeping as a means of prevention.

2. Keep fire equipment accessible at all times.

3. Report used or defective equipment to supervisor.

4. Do not block fire doors.

5. Avoid use of flame-or-spark-producing devices in hazardous areas.

6. Know your first aid fire extinguishing equipment and, if necessary, enlist the aid of the plant fire department for proper training.

7. Call the fire department promptly in case of fire, or potential fire hazard conditions.

8. Obey properly established smoking rules.

"Remember, fire prevention is an effective means toward personal safety and job security," Mr. Wecker concludes.

QUESTIONS from you ANSWERS from experts

QUESTION: "Our main production problem is getting standardization and uniformity in raw materials. This not only applies to particle size but also to analysis. This is not a problem unique with ourselves only, but I am sure that it must be common with other manufacturers. Naturally, particle size will be a problem on up through granulation and up to the bagging operation. The analysis of product always has been a problem, so if you start out wrong, you are in trouble."—Robert D. Ausen, superintendent, Smith-Douglass Co., Inc., Albert Lea, Minn.

ANSWER: (By Dr. Edwin C. Kapusta, Potash Company of America, New York.) The mixed fertilizer industry, during the past decade, has undergone a technological transformation unparalleled in its history. The introduction and large-scale adoption of granulation systems of various types, the development of processes for liquid fertilizer manufacture, the continuing trend toward higher analysis fertilizers and the growth of bulk blending are but a few of these changes.

In some instances, these innovations were made possible by the development of new and/or improved nitrogen, phosphate, or potash raw materials. In other cases, the application of these new technologies resulted in demands for types of raw materials differing substantially from those previously used in producing the older, more conventionial fertilizer mixtures.

Concomitant with these advances in fertilizer processing, and the resultant changes in the character of fertilizer raw materials and mixtures, came new production problems. Producers of mixed fertilizers, as well as their suppliers of raw materials, shared alike in these problems.

The installation of granulation equipment converted the relatively simple and straightforward method of fertilizer manufacture to a considerably more complex and intricate chemical processing operation. New and different processing machinery and equipment such as ammoniators, driers, coolers, screens, etc., were introduced into fertilizer plants. New fertilizer formulations were found to be necessary, calling for the use of raw materials, such as mineral acids, previously unfamiliar to most fertilizer mixing plants.

Last, but not least, specifications on finished granulated fertilizer mixtures were made more rigid. The final products had to conform to definite particle size limitations, as well as minimum chemical analysis. Successful and profitable plant operation necessitated the introduction of new concepts of chemical process control.

As Mr. Ausen has pointed out, this entails complete control of the process from the selection and use of raw materials to the screening and bagging or shipping of the final product.

Suppliers of basic fertilizer raw materials have recognized and reacted to the needs of the mixed fertilizer segment of the industry. At the risk of making a trite statement, these suppliers are most anxious to provide their customers with the desired type of products within the limitations of their production capabilities. As pointed out at the 1960 Fertilizer Industry Round Table sessions, it is technically possible to produce fertilizer materials meeting any desired degree of purity or particle size specification.

However, it may not always be economically feasible to make such products from the viewpoint of both the producer and consumer. Although a divergence of opinions initially existed as to types of raw materials most acceptable for use in specific processes or products, raw materials producers have moved toward definite product goals as indicated by the generally expressed desires of fertilizer producers. Granting that the need for further improvements has been indicated, considerable progress has been made by suppliers in attempting to furnish the types of raw materials and technical services essential to optimum granulation plant operation.

Nitrogen solutions specifically designed for use in granulation processes have been introduced. Phosphate and potash products are now marketed in "Standard", "Coarse", and "Granular" forms, whereas a few years ago only "Run-of-Pile" and "Granular" forms were available. In regard to potash, the present day Standard and Granular muriates differ significantly from the products

Turn to QUESTIONS page 25

HALF THE COST
—OUTPERFORMS OTHER LOADERS!

Load—turn in your tracks—unload—and you're back for more with a Melroe Bobcat. You can outwork conventional loaders two loads to one—move more material than clumsy loaders twice as big and twice as expensive!

Just push the drive levers forward to go ahead, pull them back to stop and go into reverse—move one ahead and the other back to pivot in your tracks. The completely variable speed 4-wheel drive, combined with positive double-action 8 gpm/1600 psi hydraulic load control, provides speed, precision and maneuverability that's hard to believe. The operator sits high and clear with bucket and operating area completely visible.

NEW MELROE BOBCAT

TURNS IN ITS TRACKS

The Melroe Bobcat represents a break-through in loader design. There's no transmission or differential to wear out—no gears to shift. It's big enough to lift a 1,000-lb. load over an 8-foot wall—yet compact enough to fit in the back of a pickup truck. In confined areas, it will move twice as much as loaders twice as big—yet runs an hour on one gallon of fuel. For complete specifications on the revolutionary new Melroe Bobcat, see your dealer or write to the address below.

DUST-FREE DRIVE UNITS SEALED IN OIL —GUARANTEED

ONLY $2,750

100% DRIVE AND LOAD CONTROL

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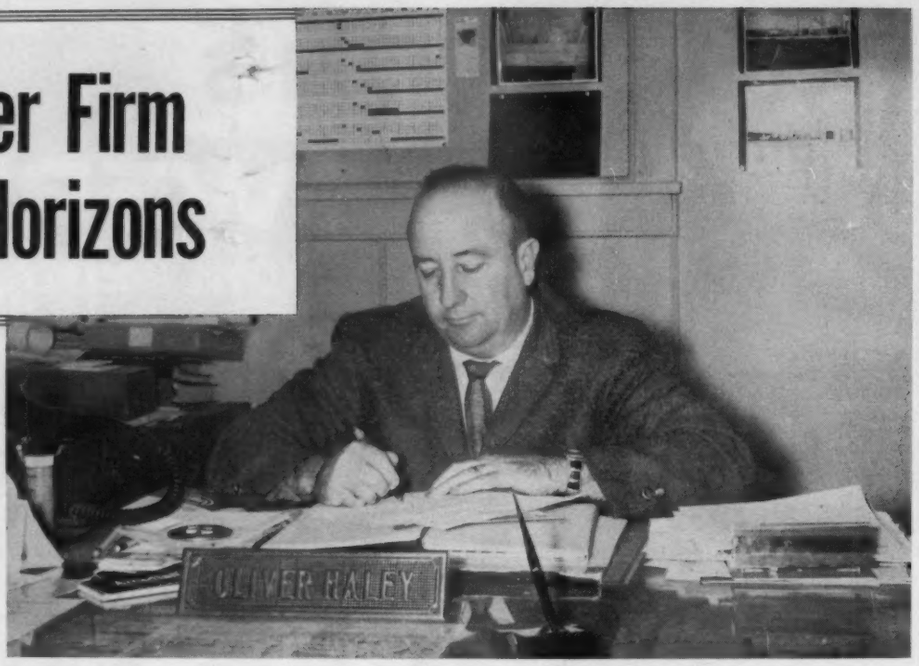
Iowa Fertilizer Firm Expands Its Horizons



FERTILIZER OPERATION — At right, Oliver Haley, president of Continental Sales Co., Nevada, Iowa, who has not only made his firm a thriving enterprise in this central Iowa area by supplying plant food products to farmers over a broad area, but has also put his company on the map through invention of a fertilizer blending device being offered to the trade. Below is R. W. Lehrkamp, production manager, at liquid fertilizer control room, at left. In center photo is view of outside storage tanks at Continental's plant at Nevada, and at the right, below, front-end view of firm's "Blend-O-Mixer" devised to mix plant nutrients at pre-set proportions. At right above, is control panel for fertilizer blender.

CONSTANT EXPANSION has been the watchword of the Continental Sales Co., Nevada, Iowa, ever since its present management took over responsibilities some eight years ago. The company engages in fertilizer mixing, liquid and dry, does application work for customers with both tow-type and truck spreaders and, within the past couple of years, has been manufacturing and installing a patented device for blending fertilizers.

Oliver Haley, president of the firm, is the sparkplug of all its activities. He invented and worked out details of the blending device called the "Blend-O-Mixer," and has long been associated with agriculture as a dealer, salesman, and finally a manufacturer of fertilizers.

The unfolding of Mr. Haley's business career is an interesting story. The sound basis for it lies in his good reputation in the Nevada, Iowa, community where he was at one time a dealer selling to farmers in the area. Later, he took on an ammonia business in 1953, and began a bulk-spreading operation. He invested in a single truck spreader in the fall of that year, but had eight by the following spring for the rush season.

In addition to the regular spreader trucks, Mr. Haley also put spreader bodies on other trucks and pressed them into service when the demand was heavy.

A little later, he became a sales representative for Continental, during which time he set up an effective dealer organization in surrounding counties and thus created a solid foundation for good distribution of fertilizer products.

The opportunity then came for him to purchase the Continental firm in Nevada. As owner, he now began to put into operation his own ideas gained through his previous years of experience in the field contacting dealers and their customers.

One of the first things he did was to inaugurate a liquid fertilizer department, which called for the purchase of pumps, valves, and storage tanks. Expansion became the watchword for the new Continental firm, but the enlarging process was done in an orderly manner and with an eye to improvement in existing processes.

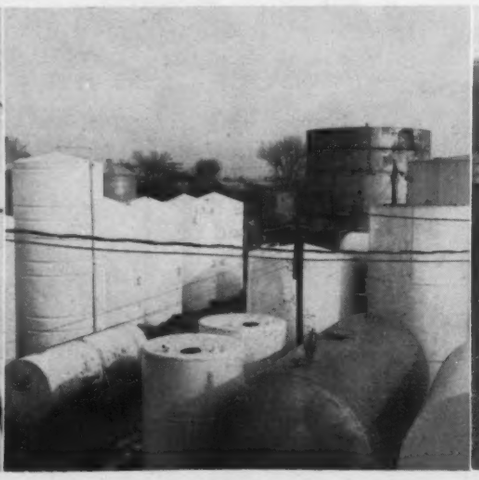
Mr. Haley noted, for instance, that there was too much lost motion in handling and moving materials. To keep costs down to the minimum, more efficient practices had to be introduced, and the management made a detailed study of the operation.

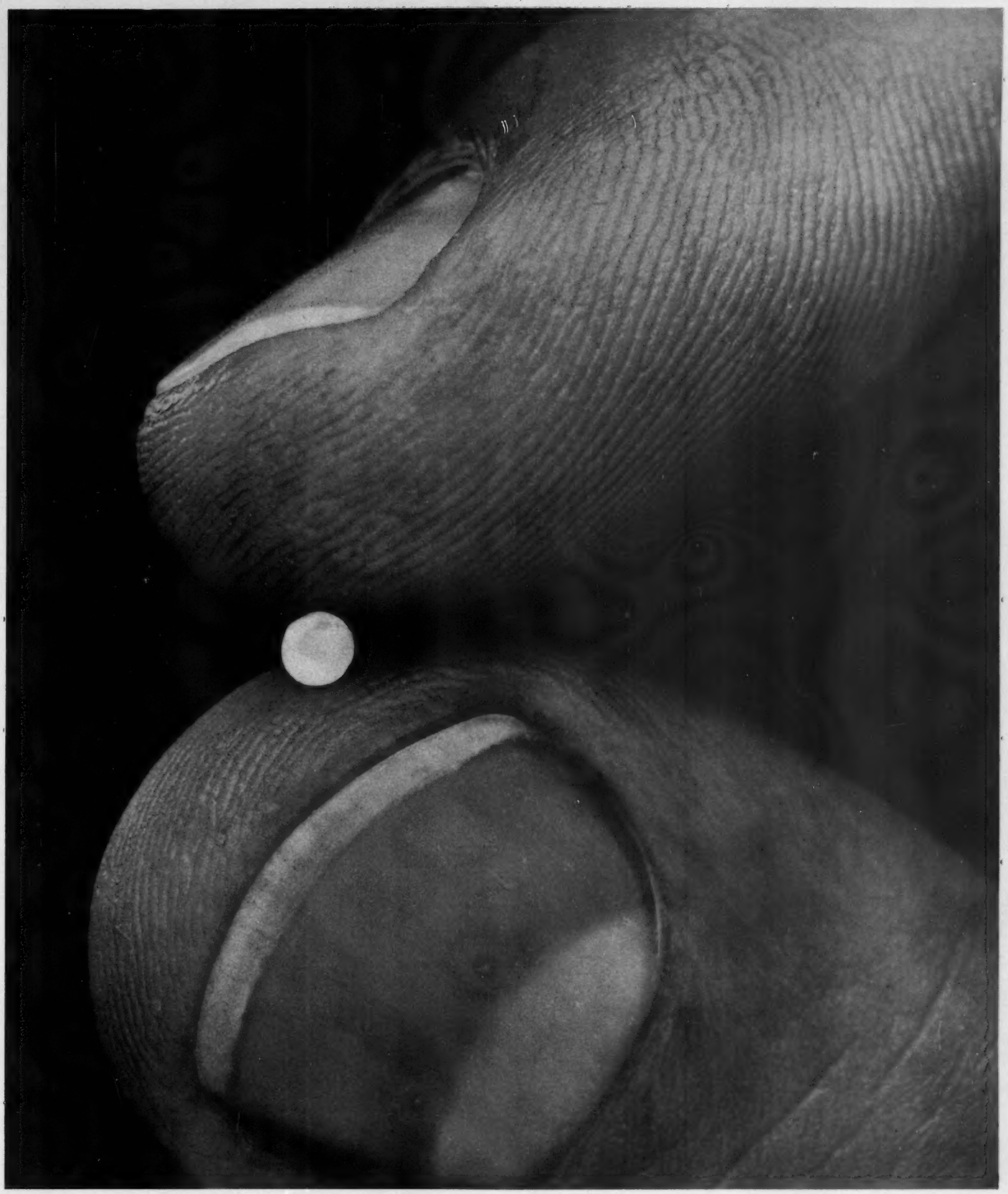
During the rush season, it was noted that operators of front-end loaders would fill their machines' tanks with gasoline, and weigh in for tare weight, early in the morning. During the remainder of the day, the machine would become lighter as the gas was consumed, and many operators in their non-stop hurry to keep up, would fail to wait until the scale needle was at the exact spot for a load. This haste, plus spillage caused by careless loading, would sometimes result in off-analysis products.

In taking these factors into consideration, Mr. Haley began to think along the line of mobile blenders which could mix both liquid and dry plant food products at different locations. His experimenting and thinking finally led him to the present device being marketed in the fertilizer industry. (The company has recently announced that it has installed 35 "Blend-O-Mixer" plants within the past year.)

With Mr. Haley at the Nevada headquarters of the company is Bud Hatcher, vice president, and Harold Fawcett, secretary-treasurer. Also as sales managers of different divisions are H. E. "Cotton" Graham, Ray Jackson, Scott Muirhead, and Glen Groomes. Oliver Haley, Jr., and R. W. Lehrkamp are plant superintendents and production managers. Mrs. Karen Plunkett, Mr. Haley's daughter, acts as his secretary.

The company recently installed a 220,000 gal. storage tank for liquid nitrogen or liquid 8-24-0 base product made by the company. In addition to the new storage tank the firm already had some 360,000 gallon storage facilities in an assortment of tanks.





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Labeling, Public Relations, Pesticides And Wildlife Topics at NAC Convention

By LAWRENCE A. LONG
Editor of Croplife

A government official who hinted that future additional laws may have to be enacted to control pesticidal residues; a lady speaker who suggested "simpler, plainer, more informative language" on labels; an industry spokesman who pointed out contradictions between federal and state label instructions; an extension entomologist, a wildlife expert, and two entertainer-lecturers featured the program of the Oct. 29-Nov. 1 convention of the National Agricultural Chemicals Assn. at the Homestead Hotel, Hot Springs, Va.

Dr. George R. Ferguson, president, Geigy Agricultural Chemicals, chairman of the NAC board of directors, told the convention that the increased size of farms in the U.S., along with their fewer numbers, has brought about changes in marketing and communications with the farmer. He pointed out that since farmers comprise only about 1% of the population, the use of mass communications to reach them becomes uneconomic, but still these users of pesticides need more chemical knowledge about such products.

The county agent is the key to the extension system in working directly with farmers, Dr. Ferguson said. However, the pesticide industry must do a better job of keeping the county agent informed on its products. "As our products become more complex, the more problems we encounter with misuse," Dr. Ferguson said. "It is of utmost importance that our industry present our products to the consumer clearly, effectively, forcefully, and accurately. The users of our products are intelligent, highly-trained and experienced people, and it is our responsibility to present the facts fully and completely."

He alluded to the industry's "read the label" campaign, commenting, however, that in the case of some products manufactured solely for sale within a single state, directions may not be in accordance with federally-accepted labeling. Thus, the farmer following such labels may find his crop confiscated when produce is shipped in inter-state commerce because of violations of federally established tolerances.

"We hope the Federal Insecticide, Fungicide and Rodenticide Act will be amended to legalize the use of federal registration numbers on the label so that the user of the product will know that he is following federally-accepted directions for use," he said.

"It is both contradictory and ambiguous when industry and government publicize a program for the grower to follow a federally-accepted label when the federal statutes themselves restrict the stating or publicizing of the fact that a label is federally-registered," Dr. Ferguson continued.

Speaking of the legislative picture, the speaker termed as ironic, the fact that it has apparently become more difficult to get registration on a compound that leaves no residue, than on one that does. This is true, Dr. Ferguson said, despite its being a part of the governmental research policy to find compounds that leave no residue. He said that one of the difficulties lies in the lack of time limits in the federal act, within which action must be taken on an application.

So far as the pesticide industry itself is concerned, one of its problems lies in the fact that only about 8% of the population realizes the value of pesticides, while the other 92% merely takes for granted the availability of high quality food at low prices. Thus, the cry of fanatics and faddists gains the ears of large numbers of people. "It is unwise, unfair, and unsound that our industry should be accused of so much chicanery, when the contributions of our industry have meant so much to the economic well-being of the nation," he concluded.

Speaking on the woman's viewpoint of chemicals in food, Miss Willie Mae Rogers, director of the Good Housekeeping Institute, declared that most women are not objective in their appraisal of anything, but tend to feel

Turn to NAC ASSN. page 34

NAC ASSN. ELECTS

Dr. George R. Ferguson, president, Geigy Agricultural Chemicals, division of Geigy Chemical Corp., Yonkers, N.Y., was named chairman of the board of directors of the National Agricultural Chemicals Assn. at the group's 28th annual meeting at the Homestead Hotel, Hot Springs, Va., Oct. 29-Nov. 1. Vice chairman of the association's board is Herbert F. Tomasek, president, Chemagro Corp., Kansas City, Mo. Both were elected to one year terms.

Also re-elected for another year were L. S. Hitchner, president, Jack Dreessen, secretary, and Miss Lee H. Grobe', treasurer.

Five new members of the NAC board of directors were also named at the meeting. The five, all to serve three-year terms, are: Howard J. Grady, president, Ortho Division of California Chemical Co., Richmond, Cal.; R. C. Harnden, president, Chapman Chemical Co., Memphis, Tenn.; Daniel J. Keating, vice president and general manager, Agricultural Chemicals Division, Stauffer Chemical Co., New York; C. D. Siverd, general manager, Agricultural Division, American Cyanamid Co., Princeton, N.J., and T. K. Smith, Jr., vice president, Monsanto Chemical Co., general manager of agricultural chemicals division, St. Louis, Mo.

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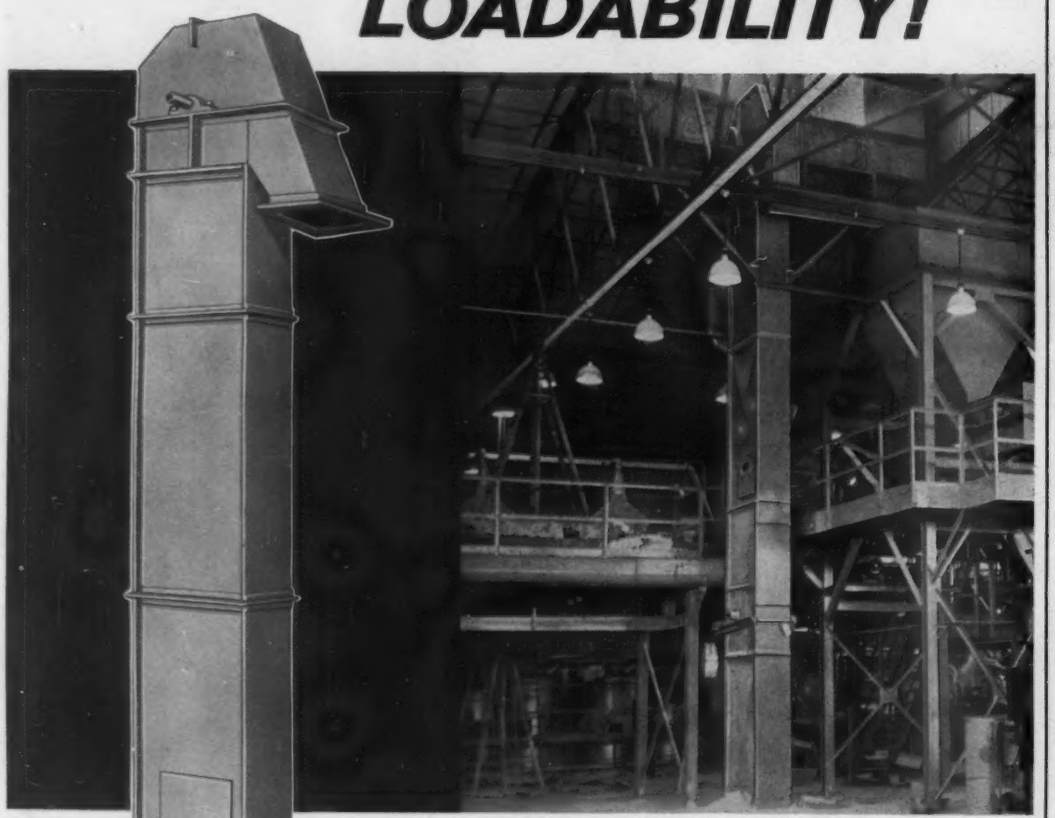

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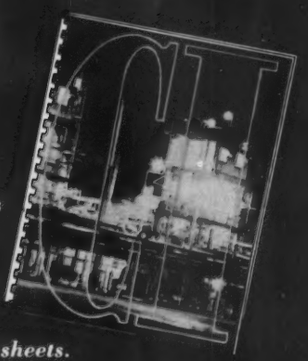

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WHAT'S NEW

IN PRODUCTS · SERVICES · LITERATURE

To obtain more information about items mentioned in this department simply: (1) Clip out the entire coupon in the lower corner of this page. (2) Circle the numbers of the items of which you want more information. Fill in the name and address portions. (3) Fold the coupon double with the return address portion on the outside and fasten the edges with a staple, cellophane tape or glue. (4) Drop in the mail box.

No. 9455—Bulk Weighing Systems

A line of bulk weighing systems with emphasis on high accuracy and speed of operation is announced by Toledo Scale, Division of Toledo Scale Corp. According to the manu-

facturer, the systems can handle almost any bulk materials which can be automatically conveyed, and can provide accurate net weights with up to one part in 4,000 accuracy. Automatic recordings of weights and space-saving design are other features of the systems. For further information check No. 9455 on the coupon and mail.

No. 9464—Polyurethane Foam Mask

Davol Rubber Co. is introducing the "Resp-R-Aid," a light weight, all-filter, polyurethane foam mask as a protection against non-toxic dusts, sprays and other respiratory irritants. The mask design is said to give maximum breathing and filter area. It is held in place by an adjustable elastic neckband. The masks are sanitized against germs before packaging, and are washable and reusable. The manufacturer says also that they will not absorb moisture or odors, and are resistant to fungus and mildew. For complete details check No. 9464 on the coupon and mail.

No. 9454—Fertilizer Control Data

B-I-F Industries has issued a two-page data sheet on the problem of accurate, close control of pelletized fertilizer analyses. It features B-I-F's Belt Gravimetric feeder and weighers. The data sheet and accompanying bulletins contain illustrations and diagrams of typical installations, and describe operation and dimensions of B-I-F equipment. To obtain a free copy of "Facts" of staying on grade check No. 9454 on the coupon and mail.

No. 9406—Water-Cooled Compressor

Construction features of Allis-Chalmers water-cooled, centrifugal compressor (Type VC) are described in a new bulletin released by the company. The compressor has a horizontally split casing, separate bearing housings, and 10 interchangeable cooler bundles. For approximate outline dimensions, typical performance curve and further descriptive information check No. 9406 on the coupon and mail.

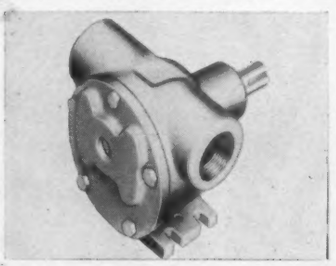
No. 9477—Fiberglass Storage Tank

Tryco Manufacturing Co. announces a new fiberglass storage tank, said to be completely corrosion proof, for storage of mixed fertilizer solu-

tions, phosphoric acid, and other non-pressure solutions. The new tank is available in capacities of 6,000, 8,000 and 10,000 gal. A variety of openings and fittings is also offered. For complete details, check No. 9477 on the coupon and mail.

No. 9467—New Metering Pumps

A new line of internal gear pumps designed for metering liquid fertilizer, insecticides, herbicides, etc.,



and for general service, is announced by The Deming Co. The manufacturer says a ⅞ in. shaft on each of the models can be driven from tractor PTO shaft, engine or chain-driven from a towed vehicle. For complete information check No. 9467 on the coupon and mail.

No. 9476—Liquid Fertilizer Applicator

The Broyhill Co. announces production of a new, high-capacity liquid fertilizer applicator designed for

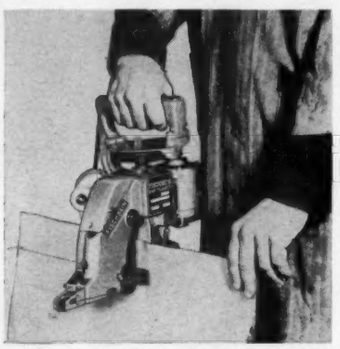
truck mounting. The manufacturer says the tank of the new unit has a 1,000 gal., capacity and is available with either 1 or 2 plastic-lined compartments. The system incorporates a 100 gal. per minute centrifugal pump controlled from the truck cab. The boom is available in various widths, in either angle iron and nylon or stainless steel. Meters may be mounted as optional equipment. For complete details, check No. 9476 on the coupon and mail.

No. 9478—New Net Weighing Machine

A new automatic net weighing machine with a 75-lb. capacity has been announced by The Exact Weight Scale Co. The manufacturer says the unit can be used separately or with existing filling and packaging equipment. The 630 Net Weigher consists of a heavy duty lever scale equipped with an air operated dump mechanism on the weigh hopper. It can be operated singly or in multiples of two or more machines. A feature of the new scale is the simplified automatic adjustable controls. A variety of optional equipment is available. For further information check No. 9478 on the coupon and mail.

No. 9475—Portable Bag Closure

A new portable bag closure has been introduced by the Dave Fischbein Co. Company officials say the new model offers increased capacity and versatility, as well as sim-



plicity of operation. The new closure, called Model D, can be used as a completely portable unit, or in one position with specially designed suspension units. A taping attachment is available for applications where tape bound closures are required. For additional information, check No. 9475 on the coupon and mail.

No. 9461—Process Control Systems

B-I-F Industries has released a new bulletin on feeding, weighing, blending and proportioning equipment for the controlled feeding of liquids and solids in process industries. It describes how process control, involving either a single unit or a fully integrated system, can be effected to handle both simple and hard-to-handle materials. The 8-page, multi-colored bulletin contains descriptive material, photographs, and schematics of typical process systems and a listing of industrial systems contained within the application range of B-I-F equipment. For free copy check No. 9461 on the coupon and mail.

No. 9470—Diaphragm Valve Bulletin

Modifications of impervious graphite diaphragm valves are illustrated by photographs, engineering drawings and dimensions, with charts showing C_v factors for each size, in a new bulletin offered by Falls Industries, Inc. The valves are recommended by the manufacturer for service with all corrosives except a few highly oxidizing agents. They are said to be immune to effects of thermal shock, non-contaminating, and to accommodate operating temperatures to 340° F. and operating pressures to 50 psi.

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- ☐ No. 9447—Bulk Weighing Scale
- ☐ No. 9454—Fertilizer Control Data
- ☐ No. 9455—Bulk Weighing Systems
- ☐ No. 9461—Process Control Systems
- ☐ No. 9464—Polyurethane Foam Mask
- ☐ No. 9467—New Metering Pumps
- ☐ No. 9470—Diaphragm Valve Bulletin
- ☐ No. 9475—Portable Bag Closure
- ☐ No. 9476—Liquid Fertilizer Applicator
- ☐ No. 9477—Fiberglass Storage Tank
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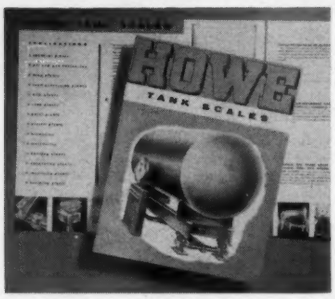
No. 9481—Tank Scale Brochure

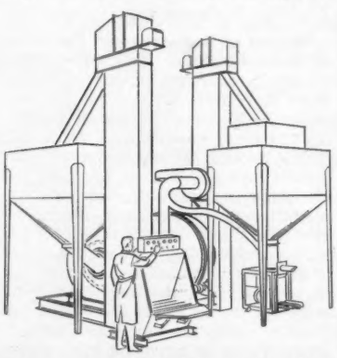
Howe Scale Co. offers a new revised brochure describing in detail their entire line of scales, designed to weigh every shape and size tank from 500 to 400,000 pounds. The scales described incorporate the manufacturer's ball-bearing feature, said to prolong the original accuracy of the scales. In addition to scales,



the brochure illustrates several indicating and recording devices which the manufacturer says can be combined with the scales to meet a wide range of weighing and weight-recording requirements. For free copy of the brochure check No. 9481 on the coupon and mail.

No. 9483—Granule Impregnating Plant

Superweld Corp. has announced the availability of granule-impregnating plants for the manufacture of pesticides and/or fertilizers. The makers claim the plant will improve blending, and reduce the percentage of



fines. It is operated on a push-button basis, producing a final product from raw materials through packaging. Its makers say the plants afford flexibility for making present granular products as well as for creating new formulations. Full description of plants is available by checking No. 9483 on the coupon and mailing.

No. 9480—Conveyor System Booklet

As the result of a grant from Hewitt-Robins, Pennsylvania State University engineers conducted a 2-year study to develop techniques for analyzing separately power consumed by troughing idlers, return idlers, return strand of belting, and the carrying belt (both loaded and unloaded). The company says this co-ordinated program has brought advances in conveyor system knowledge, much of which is contained in the published results. For free copy of the new booklet, check No. 9480 on the coupon and mail.

No. 9479—Epoxy Laminates

Tarrant Co. offers an epoxy lami nate reinforced with fiberglass, said to give added strength and resistance to corrosion. The manufacturer recommends the laminates for fertilizer or insect spray tanks, which can be made in sections and bolted together for easier shipping. The systems have also been reduced to coatings and are available to be used in the same way as paints on existing equipment. At present the company offers two resin convertor systems, the TP-1 to operate at temperatures up to 400° F. and the TP-2 to operate at temperatures up to 240° F. For further information check No. 9479 on the coupon and mail.

No. 9370—Lift Truck Catalog

The Allis-Chalmers line of lift trucks in the 2,000 to 10,000 lb. capacity ranges is described in a new 16-page catalog. Complete with photographs and other illustrations, as well as written descriptions of design, engineering constructions and operating features of the lift trucks, the new catalog presents information on power curves and specifications on each of the lift trucks. Information can be obtained on matched attachments available to increase versatility of each unit. For complete information check No. 9370 on the coupon and mail.

No. 9447—Automatic Bulk Weighing Scale

Richardson Scale Co. has introduced a new, fully automatic scale, HHH-38, said to weigh, discharge and record dusty, powdered, small-size granular materials. The manufacturer says the scale processes loads from 200 lb. to 600 lb. per discharge and provides high weighing accuracy and operating rate. For data sheet containing specifications, accessories, scale drawing and photograph check No. 9447 on the coupon and mail.

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FO-5-2

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IMC

PRODUCTION PROCESS PATENTS

3,000,723

Fertilizer Composition Comprising a Nitrogenous Compound and Hydrazine or Hydrazine Salts. Patent issued Sept. 19, 1961, to Peter C. Stevenson, Livermore, Cal. and Edward R. Hewitt, deceased, late of Parksville, N.Y.

A fertilizer composition comprising (1) a nitrogenous compound selected from the group consisting of ammonia, ammonium nitrate, and urea and (2) a compound selected from the group consisting of hydrazine and hydrazine salts; the relative amounts of said compounds being about one part by weight of compound (2) for each 6000 to 8000 parts by weight of compound (1).

A process for increasing the nitrogen available in soil for plant consumption comprising adding per acre of soil from about 50 pounds to about 300 pounds of nitrogen in the form of a fertilizer composition comprising (1) a nitrogenous compound selected from the group consisting of ammonia, ammonium nitrate, and urea and (2) a compound selected from the group consisting of hydrazine and hydrazine salts; the relative amounts of said compounds being about one part by weight of compound (2) for each 6000 to 8000 parts by weight of compound (1).

3,000,724

Manufacture of Nitrogen-Containing Complex Fertilizers. Patent issued Sept. 19, 1961, to Pierre Louis E. Langlois, Grand-Quevilly, France, assignor to Compagnie de Saint-Govain, Paris, France.

A method of making porous complex, ternary granular fertilizers containing N and K salts that comprises reacting phosphate of fertilizer grade with an acid comprising nitric acid, reacting the sludge resulting from the reaction by adding thereto a quantity of ammonia sufficient to transform substantially all of the calcium nitrate therein to ammonium nitrate without neutralizing the acid phosphate salts present in the reaction mass, permeating the sludge throughout its mass, after the ammoniation, with a substantial quantity of bubbles, of substantially inert gas, and recycling fine particles of finished product to the cellular insufflated sludge, said gaseous bubbles remaining substantially unreacted in the product, and recovering the porous fertilizer.

3,000,779

Insect Combatting Sulfoxides. Patent issued Sept. 19, 1961, to Lyle D. Goodhue and Rector P. Louthan, Bartlesville, and Kenneth E. Cantrel, Dewey, Okla., assignors to Phillips Petroleum Co.

A method of combatting an insect which comprises subjecting said insect to an effective amount of a compound having the formula

wherein R_1 is selected from the group consisting of unsaturated alicyclic and acyclic hydrocarbon radicals containing at least one bond selected from the group consisting of ethylenic and acetylenic bonds and having 3-10, inclusive, carbon atoms, wherein R_2 is selected from the group consisting of R_1, saturated and unsaturated aliphatic and alicyclic hydrocarbon radicals having 3-20, inclusive, carbon atoms, and R_2 in which a hydrogen atom is replaced by

and wherein the total number of carbon atoms in the compound is in the range 6-30.

3,000,693

Method of Removing and Disposing of Ammonia from Coke Oven Gas. Patent issued Sept. 19, 1961, to Elwood V. Schulte, Pittsburgh, Pa., assignor to Koppers Co., Inc. A process for treating gas evolved from the coking of coal which comprises contacting the gas with a wash oil for removing substantially all of the naphthalene from the gas, thereafter contacting the naphthalene-free gas with water to absorb substantially all of the ammonia and a portion of the water soluble impurities therefrom, stripping the ammonia and said water soluble impurities as vapors having a water vapor to ammonia ratio ranging between about 3.7:1 to 1:1 from said water, and burning said ammonia under temperature and heat-evolving conditions substantially precluding the formation of oxides of nitrogen.

2,998,345

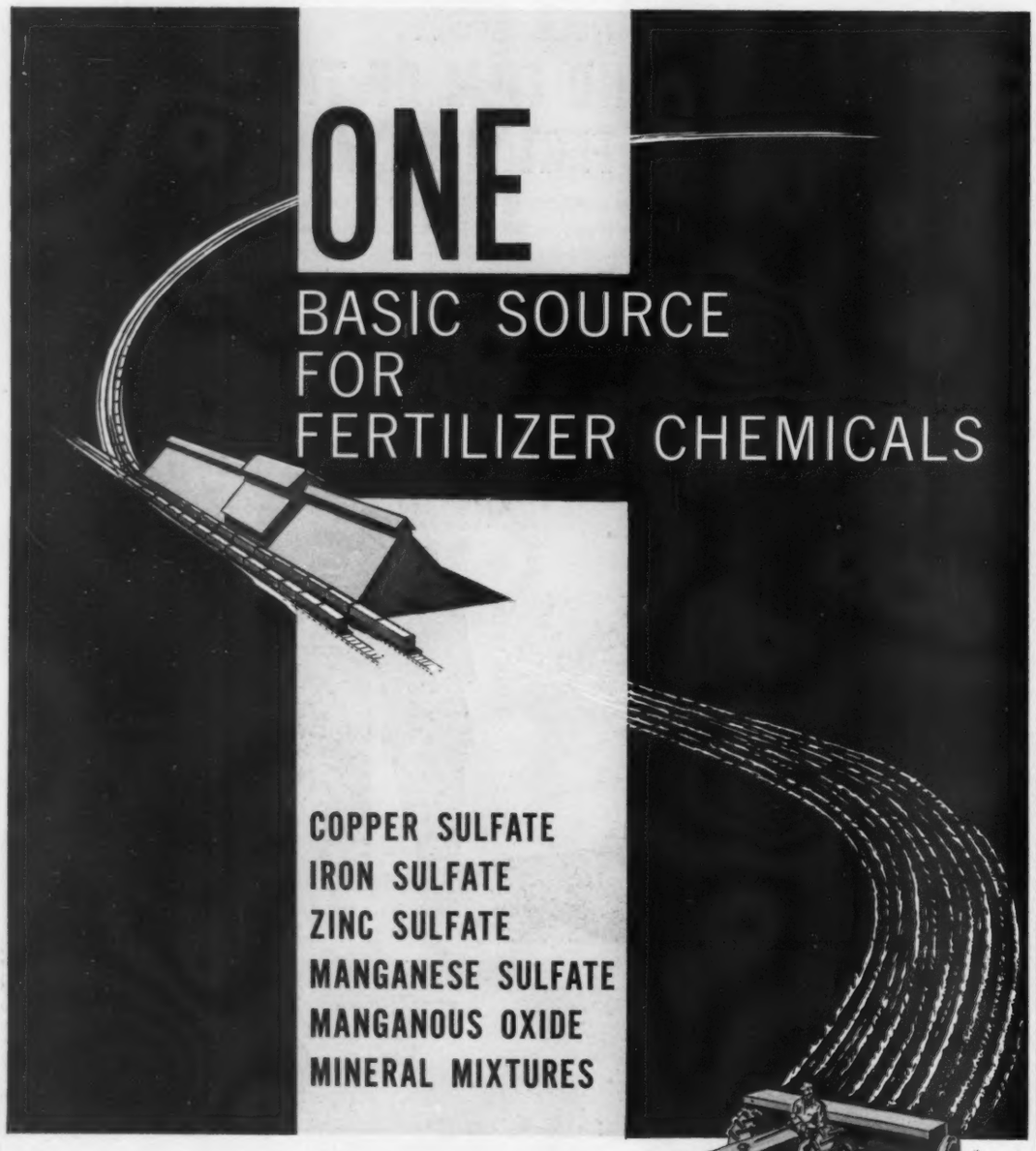
Method of Preparing Bordeaux Mixture Concentrate. Patent issued Aug. 29, 1961, to Charles H. Rogers, Norwalk, Conn., assignor to R. T. Vanderbilt Co., Inc., New York. The method for preparing a concentrated Bordeaux mixture which comprises separating the solid hydrogel from the liquid of an original Bordeaux mixture by applying mechanical force to increase relative movement between solid and liquid above that produced by gravity sedimentation until the concentration of the solids in the mixture is at least 6% expressed as $CuSO_4 \cdot 5H_2O$ and $Ca(OH)_2$ equivalent.

3,002,812

Manufacture of Defluorinated Phosphates. Patent issued Oct. 3, 1961, to William B. Williams, Birmingham, Ala., assignor to International Minerals & Chemical Corp., Skokie, Ill.

A process for manufacturing a phosphate product of low fluorine content from phosphate rock containing fluorine and silica which comprises digesting said phosphate rock in sufficient hydrochloric acid solution

Turn to **PATENTS** page 17



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How Union-Camp's 5-Star Multiwall Plan increased a pallet payload by 400 lbs. . .without increasing its size!

A leading supplier of high density resins* had been packing his product in 50-lb. sewn-bottom multiwalls. This gave him an efficient, 40-bag (2,000 lb.) pallet load.

When he added a *low density* resin to his line, however, he found his existing bag wouldn't accommodate 50 lbs. of the new resin due to its increased volume. A slightly larger, sewn-bottom multiwall was tried, but this reduced the pallet payload to 32 bags (1,600 lbs.). Net "loss": 400 lbs. Net result: more handling . . . more trips to the warehouse . . . higher cost.

Heightening the pallets to 10 tiers instead of 8, offered no solution—they wouldn't pass through the existing archways. To say nothing of the problem of loading trucks and trailer cars.

New bag does the trick

At this point, the 5-Star Packaging Efficiency Plan went to work. Union-Camp multiwall specialists experimented with several different bag sizes and styles. Their solution—a multiwall with a *pasted* bottom and side gussets, a *rectangular*-shaped base—and 20 per cent more capacity!

With the new design, 50 lbs. of the low density resin can now be packed in each bag. Most importantly, the pasted bottom bags can be palletized five to a tier, eight tiers to a skid for a total payload of 2,000 lbs.—the same as the high density resins.

Warehouse space saved

The pasted-bottom bag offered several outstanding advantages. It permitted better use of warehouse space. It increased the yield per warehouseman to *1,000,000 lbs. a month.* And it initiated the development of a similar design for the company's high density resins, which could increase the present pallet payload to 2,500 lbs.

Space-saving secret is in bottom of bag. New design (left) with rectangular-shaped base has 20 per cent more capacity than sewn-bottom bag (right).

Works for you five ways

Apart from bag construction and materials handling, Union-Camp's 5-Star Plan covers bag design, packaging machinery and specifications control. An improvement in any one of these areas conceivably could result in substantial savings for you. In any case, it costs nothing to find out. See your local Union-Camp man for complete details.

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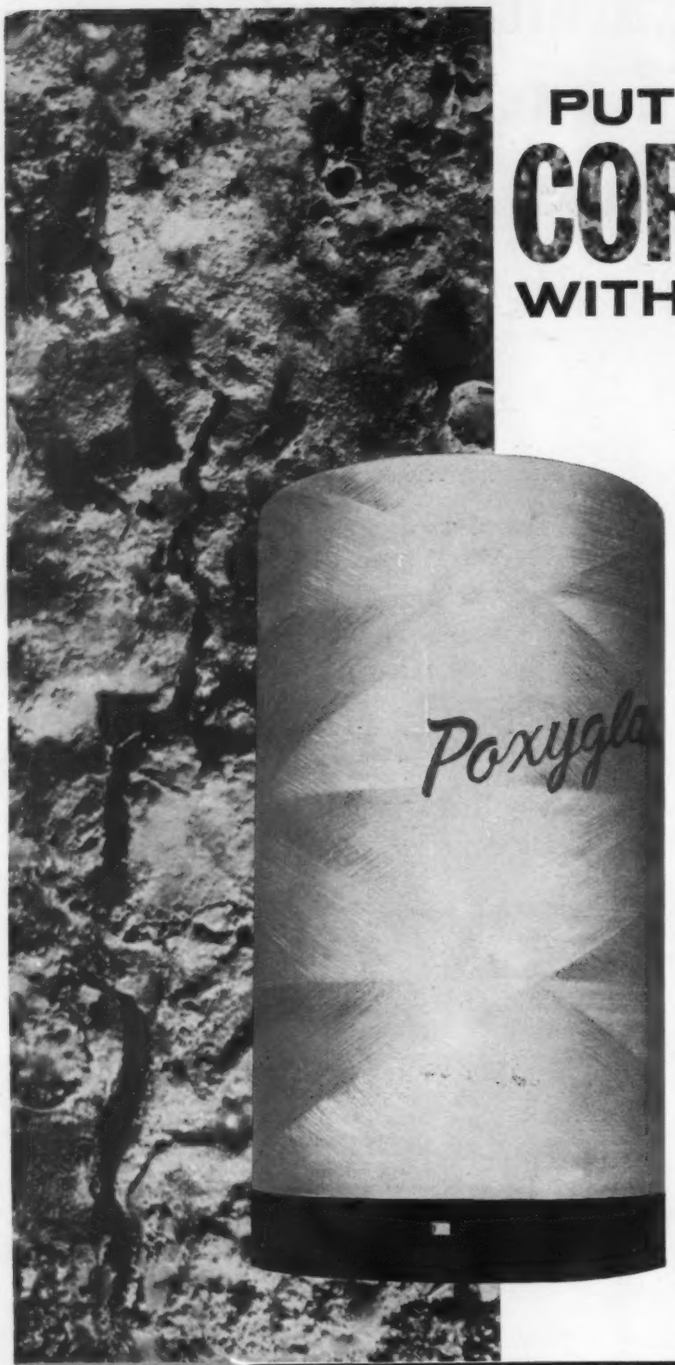

PUT AN END TO CORROSION WITH POXYGLAS TANKS!

What do you look for in solution storage or handling tanks? Resistance to corrosion is important.

But there are other characteristics you need: low initial cost, strength, low maintenance. And the tank must be able to hold all common fertilizer solutions and agricultural chemicals.

Check these desirable characteristics: see why POXYGLAS is your answer!

RESISTANCE TO CORROSION: Epoxy resin and glass are the best known deterrents to corrosion. POXYGLAS tanks are a combination of glass and epoxy resin, inside **and** out! With its resin-rich interior surface, POXYGLAS is ideal for holding all low and non-pressure fertilizer solutions: phosphoric acid, aqua ammonia, urea and nitrogen solutions, all complete mixes.

LOW INITIAL COST: Compared to other tanks with the same corrosion resistance, POXYGLAS tanks cost far less.

STRENGTH: Because of the unique filament winding process, POXYGLAS has more than twice the strength-to-weight ratio of highest quality steel.

LOW MAINTENANCE: POXYGLAS tanks require no maintenance other than normal cleaning.

Complete range of sizes from 300 to 16,000 gallons.

For more information on POXYGLAS tanks write BS&B, Industrial Air Park, Ardmore, Oklahoma. **Dept. 17-HC11**

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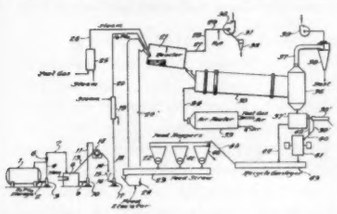
PATENTS

Continued from page 14

to decompose substantially all of the phosphate in said rock to form phosphoric acid, separating remaining solids from the resultant digestion mass to produce a substantially solids free liquid, subjecting said substantially solids free liquid to evaporation to produce a first solid of lower fluorine content than said phosphate rock, said solid containing a phosphate of calcium and calcium fluoride, digesting said first solid in an aqueous medium selected from the group consisting of water and hydrochloric acid solution to dissolve substantially all of said phosphate of calcium, separating remaining solids containing calcium fluoride from the resultant digestion mass to produce a substantially solids free liquid, and subjecting said substantially solids free liquid to evaporation to produce a substantially dried solid phosphate product having a fluorine content substantially lower than the fluorine content of said first solid and suitable for use as an animal feed ingredient.

3,002,831

Fertilizer Granulation Process. Patent issued Oct. 3, 1961, to John H. Gross and Louis E. Bostwick, Lakeland, Fla., assignors to International



Minerals & Chemical Corp., Skokie, Ill.

A process for the production of granular triple superphosphate which comprises, as a first step, reacting in a moving bed including the recycled product of said process, (a) minus 100 mesh comminuted phosphate rock at least about fifty weight percent of which is minus 200 mesh and which contains at least about sixty weight percent bone phosphate of lime, and (b) phosphoric acid containing at least about forty-five weight percent of phosphorus pentoxide, the relative proportions of said rock and said acid being such that the ratio of parts by weight of phosphorus pentoxide supplied by said acid to parts by weight of phosphorus pentoxide supplied by said rock is from about 2.2 to about 2.8, maintaining the temperature in said bed within the range of from about 220° F. to about 250° F., said reaction temperature being maintained at least in part by introducing into the acidulation reaction zone from about 150 to about 250 pounds of superheated steam per ton of product produced by said process, said superheated steam being introduced at a temperature of from about 290° F. to about 400° F. and having at least about 75° F. of superheat, and continuously discharging product from said first step;

As a second step, drying said first step product under conditions requisite to provide a dried, granular triple superphosphate product at a temperature not in excess of about 175° F., and recycling to said first step, in an amount requisite to provide a recycle ratio of from about 1.1 to about 2.0 based on the relative proportions of said recycled material and new product produced, a material selected from the group consisting of said dried second step product and mixtures of said second step product and ungranulated triple superphosphate, said mixtures containing at least about fifty weight percent of said second step product.

Industry Trade Marks

The following trade marks were published in the Official Gazette of the U.S. Patent Office in compliance with section 12 (a) of the Trademark Act of 1946. Notice of opposition under section 13 may be filed within 30 days of publication in the Gazette. (See Rules 20.1 to 20.5.) As provided by Section 31 of the act, a fee of $25 must accompany each notice of opposition.

Design, with letters IMC within six-sided outline, for phosphate and potash chemicals such as calcium phosphate, potassium carbonate, potassium chloride, potassium hydroxide. Filed Feb. 27, 1961, by International Minerals & Chemical Corp., Skokie, Ill. First use September, 1960.

Vitalium, in capital letters, for peat. Filed Feb. 6, 1961, by Kenneth J. Anderson, doing business as Anderson Peat Co., Imlay City, Mich. First use Jan. 19, 1961.

Nurana, in capital letters, for liquid fertilizer. Filed Feb. 21, 1961, by Allied Chemical Corp., New York. First use Dec. 22, 1960.

Permalite, in capital letters, for light weight aggregate for use as a soil conditioner. Filed March 27, 1961, by Great Lakes Carbon Corp., New York. First use Jan. 17, 1961.

Trona, in capital letters, for phosphoric acid and other chemical products including refrigerants. Filed Jan. 5, 1961, by American Potash & Chemical Corp., Los Angeles, Cal.

Aqua-Kleen, in capital letters, for chemical preparation useful in exterminating weeds. Filed Dec. 12, 1960, by Amchem Products, Inc., Ambler, Pa. First use April 29, 1960.

Gesaran, in capital letters, for chemical composition used as an ingredient for herbicides. Filed Jan. 26, 1961, by Geigy Chemical Corp., Ardsley, N.Y. First use Jan. 3, 1961.

Supracide, in capital letters, for chemical composition used as an ingredient for insecticides. Filed Jan. 31, 1961, by Geigy Chemical Corp., Ardsley, N.Y. First use Jan. 3, 1961.

Pyrellin, in capital letters, for wettable powder insecticide. Filed Aug. 25, 1960, by Nationwide Chemical Co., Inc., Fort Myers, Fla. First use Aug. 5, 1960.

Pramitol, in capital letters, for chemical compound used as an ingredient for herbicides. Filed Sept. 14, 1960, by Geigy Chemical Corp., Ardsley, N.Y. First use Aug. 4, 1960.

Zinophos, in capital letters, for phosphorothioate for use as nematocide, insecticide, acaracide, ovacide, and rodenticide. Filed May 26, 1960, by American Cyanamid Co., New York. First use May 12, 1960.

Allied Chemical, letters within rectangular box, for fertilizers. Filed March 16, 1961, by Allied Chemical Corp., New York. First use about May, 1959.

to the attention of the

FERTILIZER INDUSTRY:

INTERORE and several producers are being sued by an export firm for alleged violations of the Sherman and Clayton Acts. These alleged violations include conspiracy and exclusive dealings in restraint of trade in the export of phosphate rock and phosphatic fertilizers.

These charges are completely unfounded.

Interore wishes to publicly and categorically deny all of the charges.

Interore shall take such steps as are advised by its attorneys to obtain reparations for the wrongs caused by this completely baseless litigation.

INTERORE has been advised by its legal counsel that an individual seller has a legal right to sell to export markets through whomever he wishes.

He may sell exclusively through one person or one firm.

He may sell through many firms if he so desires.

There is no legal or moral obligation to do otherwise.

INTERNATIONAL ORE & FERTILIZER CORP.

500 FIFTH AVENUE, NEW YORK 36, N.Y.

FINES through the Screen

An agricultural scientist has declared that food faddists were hampering the progress of agriculture by "deliberately fomenting a wave of fear and alarm among the consumers of our country."

Dr. Robert H. White-Stevens of American Cyanamid Co.'s agricultural division said that the attacks on use of chemicals in food production had created an atmosphere which had made possible legislation that could reduce farm progress to "a veritable shambles."

Speaking at the 14th annual Animal Industry Conference in Fresno, Cal., he called for a "food production explosion" to match the world "population explosion."

Such a "food explosion," he said, could be accomplished around the world within the next half century "to the immense relief of most of the international tensions which disturb mankind today."

He said that the great achievements of American agriculture constitute "perhaps the most resounding victory democracy has won. We cannot and must not allow it to slip away. It is our margin of safety in the modern world."

●

New Jersey's crop reporting service has predicted a big honey crop for that state . . . the largest such crop since 1948. Seems that the bees, too, have stepped up their production. Total honey output is estimated at 1,320,000 lb., despite fewer colonies than were operating last year. Average yield per colony is expected to be around 40 lb., as compared with 30 lb. in 1960 and 26 lb. for the 10-year average.

Honey-lovers will be happy to know that, despite the dire predictions of some fearful folks, insecticides have NOT killed off all the bees, and there will be plenty of the sweet stuff to go around.

The honey bees, in their spare time, are used by fruit and vegetable growers in the state as pollinators. Colonies are often moved from one location to another as various crops come into bloom.

●

Fear that production from the acreage allotted to cotton for 1962 will be insufficient to supply the overall need was expressed in a recent statement by J. Clyde Wilson, Phoenix, Ariz., president of the National Cotton Council. His comments were made following the recent announcement by the Federal government of an allotment of 18.1 million acres in 1962, which is 356,706 acres less than the number allotted for the current season.

The Council had earlier asked for an acreage increase. Mr. Wilson said that the lower number of acres "will not be sufficient to permit us to provide adequate supplies for our customers both here and abroad . . . we need to raise our 1962 production to at least 15½ million bales."

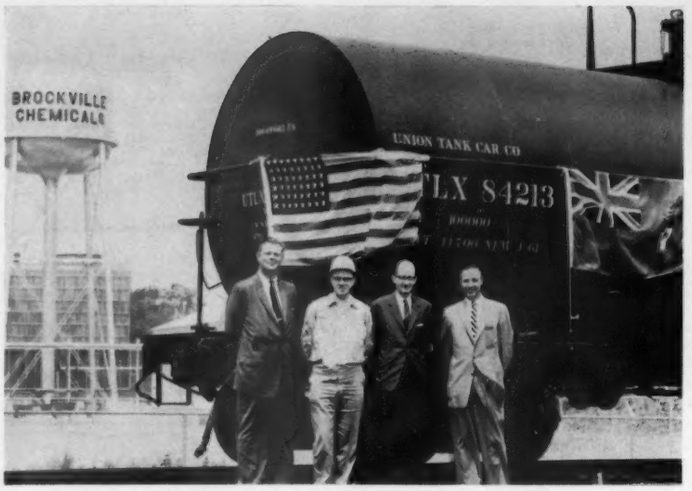
Use of recommended amounts of fertilizers, plus closer attention to control of insect pests and weed control could go a long way toward upping the cotton yield on the fewer acres, and at the same time affording the growers a better margin of profit.

●

Screwworms have reappeared in four southern states, according to the U.S. Department of Agriculture. Once eradicated from southeastern United States, the screwworm has reappeared in northern Georgia, Alabama, Tennessee and Mississippi. This pest from the Southwest has been able to slip by the inspection stations bordering the Mississippi River.

The reinfestation of over-wintering areas will necessitate extensive eradication measures, entolomogists in the area declared recently.

W. C. Nettles, extension entomologist at Clemson, S.C., has advised livestock owners to inspect livestock frequently; treat all animal wounds; collect maggots from infested wounds and notify county agent immediately; inspect all animals before movement; and notify county agent at destination when moving animals into other states.



FIRST CAR OUT—Departure of the first U.S.-bound tank car of nitrogen solutions leaves Brockville Chemicals, Ltd. plant at Maitland, Ont. Occasion is marked by company representatives. At left is J. Morse Smith, H. J. Baker & Bro., Inc., which recently announced being named exclusive U.S. distributor for the Canadian firm. With him, left to right, are J. Texhon, production manager; Dr. C. A. Vandendries, executive vice president, and B. T. Johnson, manager of sales and development, all of Brockville. The new Maitland plant which went on stream last month, produces 360 tons a day of ammonia. H. J. Baker & Bro. will distribute the company's "Bull's Eye" products in the U.S. by truck, rail, and via the St. Lawrence Seaway.

All over America, users are enjoying the benefits of the Tyler DIAL-A-MATIC Fertilizer Spreader.

They had to believe what they saw in Tyler performance, and now many of our customers have added their second, third and fourth machines.

Once a farmer has spread his fields with a Tyler DIAL-A-MATIC Spreader he will not even consider any other method.

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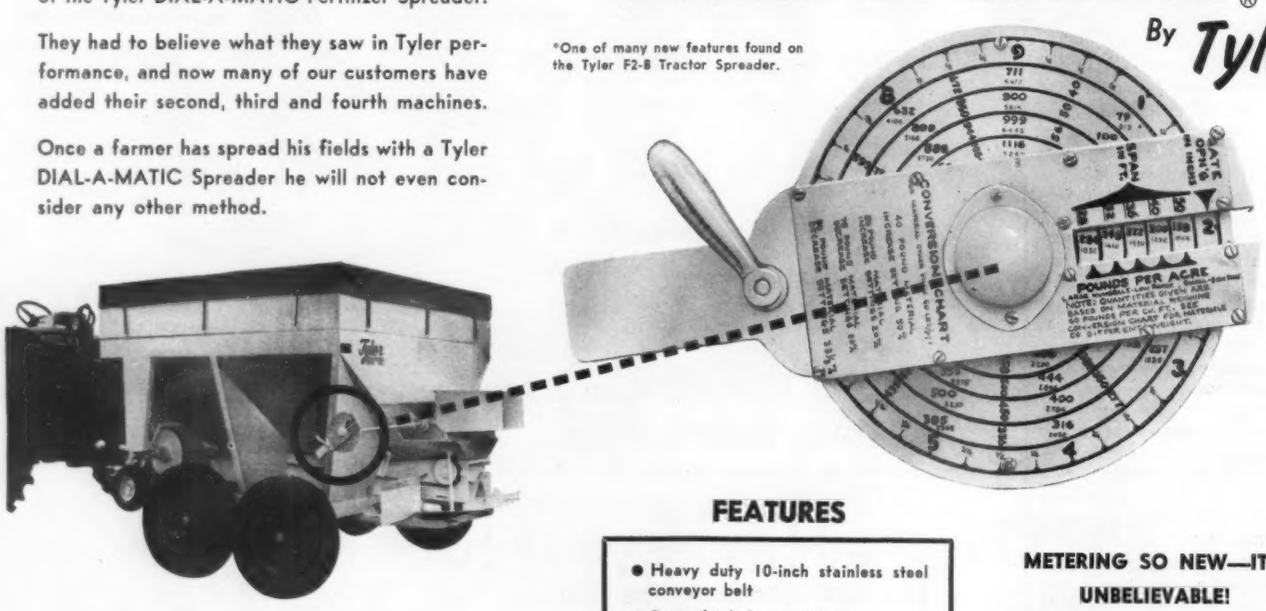
By Tyler

*One of many new features found on the Tyler F2-B Tractor Spreader.



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East Highway 12 Benson, Minn.

Arcadian® News

Volume 6 | Nitrogen Division, Allied Chemical Corporation | Number 11

Fertilizer Helps Farmers Meet Today's Problems

The fertilizer industry has helped to make farming a dynamic business. Fertilizer has increased the farmer's productive efficiency at a rapid rate. Fewer farms, larger farms and better farming are producing more food and fiber, despite government acreage control programs.

Farmers, like other business men, have found their break-even points rising to levels that make it essential to increase the dollar-producing capacity of their farms. To accomplish this, they are increasing the size of their farms and increasing the yield of every acre that is in production.

The increase in size of farms is shown in the 1959 Census of Agriculture. During the five-year period from 1954 to 1959, the number of farms with sales of more than $10,000.00 in agricultural products increased by 36%. The average acreage per farm increased from 242 acres in 1954 to 302 acres in 1959 or nearly 25%. During the same period, the average value of land and buildings per farm increased by 63%—more than twice as rapidly as the growth in size.

More farmers are now owners of all or part of the land they farm. In 1959, only one farm in five was operated by a tenant.

In addition to increasing their per-farm acreage, farmers are buying more production items to increase their efficiency. For example, from 1954 to 1959, the percent of total farms on which commercial fertilizer was used increased from 60.9% to 78.7%. As a result, the number of acres fertilized *increased* by 9,323,623 in contrast to a decrease of 38,102,782 total farm acres. Total tons of fertilizer used increased from 18,869,-117 in 1954 to 19,673,506 in 1959. The average amount of fertilizer per farm increased from 3.9 tons in 1954 to 5.3 tons in 1959.

The 1959 national summary shows data on use of commercial fertilizer by selected individual crops; number of states in which each crop was selected; number of acres on which used; number of tons of dry materials and liquid material used.

The 1961 feed grain program was designed to reduce production by about 18%. Instead, the October estimate is only 11% below last year's record. How did our farmers produce this almost miraculous result? They did it by putting their poorest land in the reserve; by using almost as much fertilizer and chemicals on their best acres as on their total land last year; by increasing the plant population per acre; and by getting good growing weather.

Similarly, the U.S.D.A. estimated on October 9, 1961 that this year's cotton crop would total 14,334,000 bales of

(continued on following page)

Selected Crops	No. of States	No. of Acres Fertilized	Tons Dry Materials	Tons Liquid Materials	Total Tons
Corn	39	50,730,690	6,131,709	653,869	6,785,578
Hay and Cropland pasture	48	13,260,034	2,126,166	54,714	2,180,880
Cotton	12	8,600,447	1,432,958	201,902	1,634,860
Wheat	26	16,991,959	1,292,626	115,385	1,408,011
Non-cropland pasture	48	4,701,760	777,814	17,922	795,736
Tobacco	6	831,964	654,606	2,209	656,815
Irish potatoes	22	883,451	442,418	11,454	453,872
Soybeans	14	2,735,313	275,610	6,093	281,703
Sorghum	4	2,352,711	82,831	70,787	153,618
Sugarbeets	9	650,135	109,761	36,525	146,286
Barley	7	981,551	36,581	16,066	52,647
Oats	5	189,873	16,012	1,335	17,347
All other Crops	48	29,255,920	4,759,003	347,134	5,106,137
		132,133,068	18,137,085	1,536,421	19,673,506

(continued from preceding page)

500 pounds gross weight. This estimate compares with 14,272,000 bales produced last year and 13,553,000 bales for the ten-year (1950-59) average.

Cotton is being grown under planting and marketing controls designed to prevent excess production. As a result, the 1962 cotton planting allotment has been cut by 1.9% despite pleas by growers, the industry and some Southern Congressmen that it be increased because of indicated strong demand, the low level of stocks, and the tense world situation.

Under the control program the national allotment will be broken down among the states, counties and individual farmers largely on the basis of their past plantings. Each farm's marketing quota would be the amount grown on its allotment.

Crops under control programs and grown on excess acres will subject the grower to stiff penalties. Every development in the Federal crop control programs indicates the importance to a grower of having the best possible record of production per acre. All of which makes it more important than ever for growers to have their soil tested and to provide the fertilizer needed for maximum production.

The government's new program of paying farmers to retire a percentage of their acres allocated for planting specified crops has been extended to include additional feed crops and wheat next year. It is estimated that the cost of the enlarged program for 1962 crops may be double the amount paid to corn growers this year.

Under the wheat plan, which has been approved by the growers in a referendum, there would be a mandatory reduction of 10% from individual acreage allotments. Farmers would be paid to reduce their acreage planted to wheat and would receive a support price of $2 per bushel, as compared to $1.79 for the 1961 crop. Also, there are provisions for farmers who cooperate voluntarily to reduce their wheat acreage an additional 30%. It is estimated that the total wheat planting next year may be less than 50 million acres. If weather conditions are good, it is estimated that the 1962 harvest will exceed 1 billion bushels.

During the last 10 years, production per acre of feed crops and wheat has been increasing steadily as a result of the use of improved seeds, more scientific use of fertilizers and better cultivation methods.

The Profitable Use of Phosphoric Acid in Mixed Fertilizer

Under certain conditions phosphoric acid is a valuable source of plant food for the manufacturer of mixed fertilizers. Its high concentration permits formulation of grades that are impossible with other phosphate materials. Its capacity to take up large amounts of ammonia also offers advantages.

In fact, the advantages of phosphoric acid can help manufacturers to produce some formulas more economically, despite its relatively high cost per unit of P_2O_5. One disadvantage of phosphoric acid, as compared to sulphuric acid, is its lower heat of reaction and its higher moisture content. This limits the use of phosphoric acid in semi-granular fertilizers.

Three Different Types

Phosphoric acid is usually known by the process by which it is made—either wet-process acid or furnace acid. This terminology can be misleading because there are two different types of wet-process acid: 1) the ordinary wet-process acid, a dark molasses-type liquid; 2) the refined wet-process acid, a relatively clear liquid with a light green color. The storage and handling characteristics of the latter are very similar to those of furnace acid. With the ordinary wet-process acid, the high impurity content and fluctuating viscosities can create problems.

Furnace acid has the highest purity of the three types, but definite granulating advantages have been noted for wet-process acid. Some operators attribute this to its lower moisture content and its iron and alumina impurities.

Experience has shown that the use of phosphoric acid in conjunction with sulphuric acid in a pre-reactor has improved the performance in both the pre-reactor and the ammoniator. Care should be taken in the selection of the wet-process acid for this use because some acids have been known to cause foaming in the pre-reactor.

Certain grades of wet-process phosphoric acid and sulphuric acid on the market today contain relatively high amounts of organic impurities. When used in fertilizers containing large amounts of ammonium nitrate, the organics can act as a sensitizer, lowering the decomposition temperature of the ammonium nitrate.

Phosphoric acid can be handled with little difficulty if the proper techniques and equipment are utilized. For continuous metering, the float-type flowmeter has given good results with furnace acid and refined wet-process acid. For ordinary wet-process acid, the magnetic flowmeter is a necessity. It is also a good investment for the other types of phosphoric acids. Most of the common batch meters are satisfactory in batch operations but they should be stainless steel for maximum life and performance.

Storage equipment should be constructed of materials specifically recommended for phosphoric acid at the concentrations and temperatures employed. Stainless steel is very satisfactory. It is often used for pipelines and valves. Rubber-lined tank cars are excellent for permanent storage. New developments in fabrication of collapsible rubber tanks offer some interesting possibilities in the transporting, and temporary and permanent storage of phosphoric acid. Certain plastics are also satisfactory for these uses, the largest application being flexible tank liners and pipelines. The pond storage system is also being used for low-cost storage of large quantities of phosphoric acid. This system should not be used and the ponds should not be constructed, however, without first consulting people who are thoroughly experienced in this method. Certain construction techniques are essential for satisfactory performance.

A Word of Warning

Do not use phosphoric acid through sulphuric acid equipment and do not use sulphuric acid through phosphoric acid equipment. This precautionary advice is not due to any danger in mixing the two acids. Materials used in constructing equipment for one of the acids may be completely satisfactory for one of the acids and completely unsatisfactory for the other acid. This fact should be kept in mind when designing connecting systems where there is a possibility of flowback.

Safety equipment and precautions are necessary in handling both phosphoric acid and sulphuric acid.

NOTE: The information furnished in this issue of the ARCADIAN News is obtained from studies and tests considered reliable; results, however, are not guaranteed.

Arcadian News for Fertilizer Manufacturers from Nitrogen Division, Allied Chemical

AMMONIATING TO GET THE DESIRED RATIOS

You have many different ARCADIAN® Nitrogen Solutions and other materials from which to select those best suited to your formulation needs, whether you produce low-analysis or high-analysis fertilizers in pulverized, granular or semi-granular form.

Making the best selection is not always a simple matter. It can be a perplexing problem to choose the right combination of ingredients to produce the desired weights and plant food ratios and to control moisture and keep costs down.

This is true even in the production of fertilizer from which moisture is not to be removed. It is a more complex problem as analyses are raised and when moisture is to be removed as in granulation, or held to a low level as in semi-granulation.

The table shows how such problems are solved, using three different ARCADIAN Nitrogen Solutions as examples. Many other combinations are obtainable with these and other Solutions.

The table shows how to get a specific ratio of nitrogen to other ingredients within definite weight limits. Three different solutions are shown combined with normal superphosphate, triple superphosphate, sulphuric acid, and phosphoric acid. For efficient use of this table, you can find the pounds of neutralizing ammonia per unit of nitrogen in each solution on the back page of this issue of the ARCADIAN News.

The desired formulation may demand the maximum use of 20% superphosphate for its low-cost P_2O_5 combined with its ability to react with large amounts of ammonia for low-cost nitrogen in the formula. Supplying one unit of P_2O_5 with 20% superphosphate neutralized with six pounds of ammonia from URANA® 6C adds about 122.2 pounds dry weight. The product analyzes 10.6% N and 16.4% P_2O_5 and has a total of 27% plant food.

A great increase in plant food concentration results when one unit of P_2O_5 is supplied by 75% phosphoric acid (54.3% P_2O_5) and this acid is neutralized with 7.2 pounds of ammonia from URANA 6M. Only 58.3 pounds dry weight is involved and the product analyzes 24.6% N and 34.4% P_2O_5.

Flexibility in economy, heats generated, concentration of plant foods and influence on condition are achieved by using triple superphosphate or sulphuric acid for neutralizing ammonia.

Heat of ammoniation varies greatly with different materials. The proper amount of heat aids moisture removal and granulation. To raise one ton of fertilizer 1°F. requires 500 BTU's. Evaporation of one pound of water absorbs about 1,040 BTU's which will cool a ton of fertilizer about 2°F.

HEAT GENERATED BY REACTING AMMONIA

Material	BTU's of Heat per Pound of Ammonia
Superphosphate 20% P_2O_5	1460
Triple Superphosphate	1540
Phosphoric Acid	1900
Sulphuric Acid	2940

Nitrogen Division Technical Service is always ready to help you with ammoniation and formulation problems. Write to Technical Service, Nitrogen Division, Allied Chemical Corporation, 40 Rector Street, New York 6, N. Y.

MATERIALS COMBINED AMMONIATION RATES	BASED ON ONE UNIT	NITRANA® 7 TOTAL LBS. PRODUCT	% N	% P_2O_5	TOTAL %	URANA® 6C TOTAL LBS. PRODUCT	% N	% P_2O_5	TOTAL %	URANA® 6M TOTAL LBS. PRODUCT	% N	% P_2O_5	TOTAL %
Superphosphate 20%	P_2O_5												
6.0% H_2O													
6.0 lbs. NH_3/Unit P_2O_5													
***WET TOTALS**		**123.7**	**8.65**	**16.2**	**24.9**	**130.0**	**9.92**	**15.4**	**25.3**	**127.3**	**9.4**	**15.7**	**25.1**
DRY TOTALS		116.4	9.2	17.2	26.4	122.2	10.6	16.4	27.0	119.7	10.0	16.7	26.7
Triple Super. 47%	P_2O_5												
3.0% H_2O													
3.0 lbs. NH_3/Unit P_2O_5													
***WET TOTALS**		**54.3**	**9.8**	**36.8**	**46.6**	**57.5**	**11.2**	**34.8**	**46.0**	**56**	**10.7**	**35.7**	**46.4**
DRY TOTALS		52.4	10.1	38.1	48.2	55.3	11.7	36.2	47.9	54	11.1	37.0	48.1
Sulphuric Acid 66° Be	N												
93.19% Acid													
3.1 lbs. Acid/lb. NH_3													
***WET TOTALS**		**79.3**	**25.2**	**0.0**	**25.2**	**75.3**	**26.6**	**0.0**	**26.6**	**76.5**	**26.1**	**0.0**	**26.1**
DRY TOTALS		74.5	26.8	0.0	26.8	70.6	28.3	0.0	28.3	71.7	27.8	0.0	27.8
Phosphoric Acid	P_2O_5												
75% Acid													
54.3% P_2O_5													
7.2 lbs. NH_3/Unit P_2O_5													
***WET TOTALS**		**65.2**	**19.6**	**30.6**	**50.2**	**72.8**	**21.3**	**27.5**	**48.8**	**69.5**	**20.7**	**28.8**	**49.5**
DRY TOTALS		54.5	23.4	36.7	60.1	61.4	25.2	32.6	57.8	58.3	24.6	34.4	59.0

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NITRANA®										
2	41.0	22.2	65.0	—	12.8	27.7	10.8	1.137	10	21
2M	44.0	23.8	69.8	—	6.4	27.8	10.8	1.147	18	15
3	41.0	26.3	55.5	—	18.2	23.6	12.8	1.079	17	-25
3M	44.0	28.0	60.0	—	12.0	23.9	12.7	1.083	25	-36
3MC	47.0	29.7	64.5	—	5.8	24.0	12.6	1.089	34	-30
4	37.0	16.6	66.8	—	16.6	31.5	8.9	1.184	1	56
4M	41.0	19.0	72.5	—	8.5	30.9	9.2	1.194	7	61
6	49.0	34.0	60.0	—	6.0	21.4	13.9	1.050	48	-52
7	45.0	25.3	69.2	—	5.5	26.7	11.2	1.134	22	1
URANA®										
6C	43.0	20.0	68.0	6.0	6.0	27.7	9.3	1.180	12	39
6M	44.0	22.0	66.0	6.0	6.0	26.3	10.0	1.158	17	14
10	44.4	24.5	56.0	10.0	9.5	22.1	11.0	1.114	22	-15
11	41.0	19.0	58.0	11.0	12.0	24.7	9.2	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	19.7	11.7	1.087	25	- 7
13	49.0	33.0	45.1	13.0	8.9	16.1	13.5	1.033	51	-17
DURANA® (contains 8% formaldehyde)										
20	37.0	13.3	53.4	15.9	9.4	25.3	7.2	1.235	0	36
U-A-S®										
A	45.4	36.8	—	32.5	30.7	—	16.2	0.932	57	16
B	45.3	30.6	—	43.1	26.3	—	13.5	0.978	48	46
ANHYDROUS AMMONIA	82.2	99.9	—	—	—	—	24.3	0.618	211	-108

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Memphis 9, Tenn., 1929-B South 3rd St. Whitehall 8-2692
Indianapolis 20, Ind., 6060 College Ave. Clifford 5-5443
San Francisco 4, Cal., 235 Montgomery St...Yukon 2-6840

MEN MOVING AHEAD

Continued from page 5

ly by Ortho Division, California Chemical Co., Richmond, Cal., include the following: **William J. Rivers** has been appointed an Ortho sales representative for the Watsonville, Cal., area, according to **M. W. Choate,** district manager. **Charles Michals** has been named an employee relations representative, according to **E. H. Solinsky,** manager of employee relations for the company.

A number of transfers have been made from the company's research and development to its manufacturing department, according to an announcement by **Howard J. Grady,** president. These appointments were made: **M. A. LeBrun, Jr.,** becomes chief plant chemist; **L. V. Westerlund** becomes lead control chemist; and **R. G. Terranova** becomes assistant chemist.

●

Ray Tongate has been appointed as sales manager of Simonsen Manufacturing Co., Quimby, Iowa, according to an announcement by **Merle Simonsen,** general manager. The firm makes truck bodies for fertilizer spreaders and pull-type spreaders for fertilizers. Mr. Tongate was formerly associated with the Carey Salt Co., Hutchinson, Kansas.

Ray Tongate

●

Lyman H. Goff, Jr., manager of the Norfolk, Va., bag plant and sales division of Bemis Bro. Bag Co., has been assigned to the company's allied operations staff and will direct paper specialty and polyethylene bag activities, the company has announced.

In related assignments, **R. W. Lahey, Jr.,** succeeded Mr. Goff as manager of the Norfolk plant and sales division, and **R. J. Boher** became sales manager of the Norfolk sales division. Mr. Lahey previously was sales manager and Mr. Boher a salesman with the sales division there. Mr. Goff is headquartered in Minneapolis in his new assignment.

William J. Cannon, New York, has joined Hooker Chemical Corp. as manager of advertising and sales promotion, with headquarters at the company's offices in Niagara Falls, N.Y.

The announcement was made by **William F. Christopher,** director of marketing.

●

The Bemis Bro. Bag Co. has announced division of its central operations area into central and northern operations areas with **T. H. Ashton** as director of northern operations and **S. M. Spencer** as director of central operations. **Judson Bemis,** president, said the realignment was made to adjust to the needs of the company's broadening product lines and operations.

Erik C. Ekedahl

Donald R. Margo

Thomas M. Sheehy

James H. Zoellner

Two new district sales managers and two technical sales representatives have been appointed by the materials department, agricultural chemicals division of International Minerals & Chemical Corp., the firm has announced.

New district sales managers are **Erik C. Ekedahl,** Columbus, Ohio, whose district includes Ohio and Michigan and **Donald R. Margo,** who will direct sales in Arkansas, Louisiana, Mississippi and western Tennessee.

The newly appointed technical service representatives are **Thomas M. Sheehy,** Shreveport, La., and **James H. Zoellner,** Atlanta, Ga. Mr. Sheehy's district includes Arkansas, Louisiana, Mississippi, Missouri, Tennessee, Arizona, New Mexico, Oklahoma and Texas. Mr. Zoellner is technical service representative in Georgia, North Carolina, South Carolina, Tennessee, Alabama and Florida.

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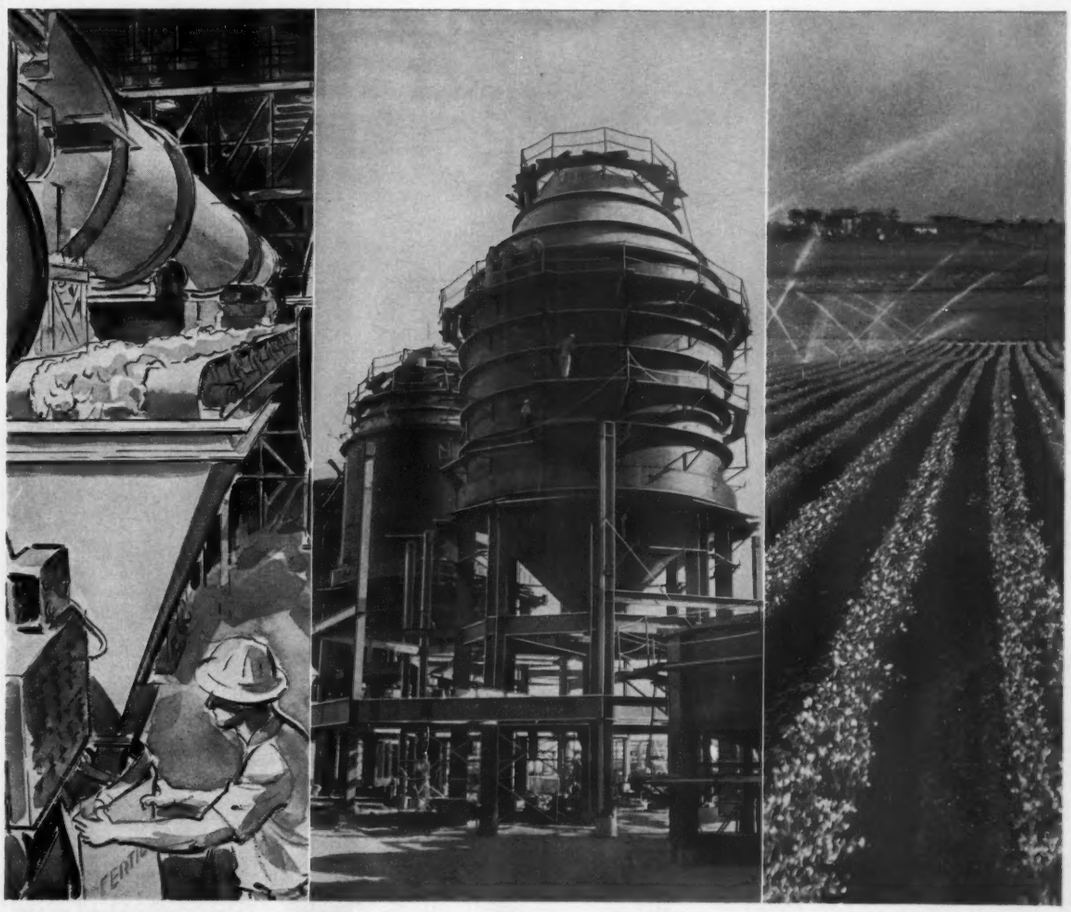

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AT COLORADO MEETING—Research and education committee members of the NPFI and the Rocky Mountain Plant Food Assn. are seen at Silver Springs Lodge, Colo. during their recent meeting. Standing, left to right: M. J. "Bud" Hartman, Phillips Petroleum Co., Bartlesville, Okla.; Duane Fountain, Phillips, Denver, Colo.; Wright Erwine, Phillips, Denver; William Mierke, Bennett Chemical Co., Denver; Frank Kennedy, Potash Company of America, N.Y.; and Bob Billings, PCA, Ames, Ia. Kneeling in front are: Bill Griffith, Phillips, Denver; Ed McMillan, Spencer Chemical Co., Colorado Springs, Colo.; and Jack Crail, Spencer, Colorado Springs. (Photo courtesy National Plant Food Institute)

Colorado Soil Fertility Training Session Draws Industry People to October Meeting

Continuation of the Colorado Soil Fertility Training Sessions in Western Colorado was assured through the joint cooperation of the National Plant Food Institute, Western Research and Education Committee, and the Rocky Mountain Plant Food Assn. during discussions at the recent fall business meeting of the association held at Silver Springs Lodge near Durango, Colo.

M. J. "Bud" Hartman, Phillips Chemical Co. and Inter-mountain section chairman of the committee, reported that more than 200 fertilizer representatives participated in the Colorado soil fertility training sessions series held at four Northeastern Colorado locations during 1961 and recommended that the program be expanded to Western Colorado during 1962.

Under the leadership of Ed McMillan, Spencer Chemical Co., president, Rocky Mountain Plant Food Assn. funds have been made available to continue the agronomy achievement scholarship at Colorado State University.

The Rocky Mountain Plant Food Association also will co-sponsor the Colorado achievement awards program for 200 bu. corn growers and 10,000 lb. beet sugar producers in cooperation with the National Plant Food Institute, it was announced.

Ideas and suggestions for the Colorado Fertilizer Conference to be held in January, 1962, at Colorado State University were discussed, proposed program development featuring range and meadow fertilization, fertilizer effects on crop quality, irrigation-fertilizer relationships and results of Intermountain Intensified Soil Fertility programs.

Richard B. Bahme, Western Director, NPFI, discussed the Institute's program in Colorado and lauded the joint effort with the Rocky Mountain Food Assn.

Short Course on Fertilizer Technology Planned

A short course on fertilizer technology and use will be held at Purdue University, Feb. 12 and 13, 1962, under the sponsorship of the Soil Science Society of America, it was announced by Dr. Werner L. Nelson, president of the society.

Chairman of the committee arranging for the short course is Dr. Malcolm H. McVickar, Ortho Division, California Chemical Co. Other committee members include: Dr. R. A. Krantz, University of California; Dr. R. D. Munson, American Potash Institute; Dr. L. B. Nelson, TVA; Dr. R. W. Starostka, Davison Chemical Division, W. R. Grace & Co., and H. H. Tucker, Sohio Chemical Co.

The purpose of the short course is to bring together recent information on fertilizer technology and resources in the U.S. for use by college and industry men.

Program details are being developed and will be announced as soon as they are available, according to Dr. Nelson.

The short course will immediately precede the annual joint meeting of midwestern agronomists and fertilizer industry representatives at the Edgewater Beach Hotel, Chicago, Feb. 15 and 16, 1962, sponsored by the National Plant Food Institute.

Soils and Fertilizer Short Course Planned for December

The annual soils and fertilizer short course of the University of Minnesota will be held at Coffey Hall auditorium on the St. Paul campus Dec. 4, according to an announcement by Dr. William P. Martin, head of the department of soils, University of Minnesota.

Featured speaker of the day will be Dr. Robert H. White-Stevens, manager of the nutrition, physiology and biochemistry section of American Cyanamid Co. The meeting is scheduled to begin at 9 a.m.

According to Dr. Martin, attendance at the meeting is expected to be from 500 to a thousand, comprising fertilizer industry personnel and professional agriculturists.

New Indiana Firm

A new fertilizer firm, Royal Chemical Corp., has been formed at Royal Center, Ind. The new company will build and operate a dry fertilizer blending plant. President of the company is Earl Campbell.

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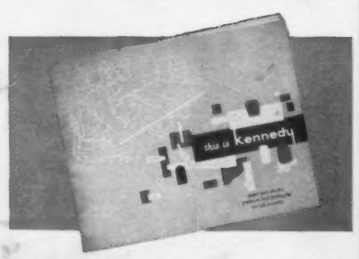

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QUESTIONS and ANSWERS

Continued from page 7

of yesteryear both as to particle size and chemical analysis.

As in the case of the mixed fertilizer industry, product quality control in the potash industry has assumed paramount importance with the imposition of more stringent product specifications. Producers have made considerable capital investments in improved handling and screening equipment and other aspects of in-plant chemical control to eliminate or reduce day-to-day variations in product quality. Shipments of a given product from an individual producer will in the majority of cases show only modest variations in analysis.

One of the speakers at the 1960 Fertilizer Round Table estimated that the car-to-car variation in potash analysis from a particular plant to be in the order of perhaps plus or minus 2 tenths per cent K_2O from the average of several years' production. Needless to say, somewhat larger variations may exist in products supplied by different producers depending on the method of production employed, the grade and type of ore processed, etc.

This is somewhat typical of the problems of the mineral extraction industry. The same type of variation in analysis may also apply to phosphate products as indicated by the speakers representing the phosphate producers at the aforementioned Round Table meeting.

Variations in analysis of products from various sources is recognizably a problem faced by Mr. Ausen and others charged with the responsibility for fertilizer production. Where raw materials are received from several sources, variations in analysis may be minimized by scheduling deliveries from these producers in such a manner as to preclude mixing of materials from sources showing larger than desired variation in analysis.

This procedure, of course, results in the necessity for altering formulations to account for differences in analysis of raw materials being used. Separate storage of like products is another possible approach to reducing variations in analysis. However, this is rarely a practical solution because of the restricted storage space available in most plants.

Prompt and complete knowledge of the chemical analysis of individual shipments of raw materials is also essential to formulation of mixtures and plant process control. Raw materials producers are cognizant of the need for this information and make every effort to provide it rapidly and completely. In the case of the potash industry, producers mail shipping notices, containing chemical analysis and related information concerning individual shipments. This information is generally received well in advance of the arrival of the car. However, in some cases, this information may not be immediately channeled to the proper production staff member. Such situations should be easily remedied.

Before closing, I should like to note progress which has been made on another facet of this problem. As mentioned earlier, many new or improved fertilizer raw materials have been introduced in recent years. New product names and trade designations followed, resulting in a confused product nomenclature. This problem has been largely resolved through the efforts of committees appointed by the National Plant Food Industry.

A few years ago, one of these committees recommended a system of uniform nomenclature for use in describing nitrogen solutions. Earlier this year, another such committee suggested standards of nomenclature for muriate of potash products. These actions have proved to be mutually beneficial to raw materials suppliers and their customers.

In conclusion, production and shipment of desired products of uniform quality are the desire and goal of all raw materials suppliers. Considerable progress has been made and continues to be made toward this end. Some examples of this progress have been cited. Standardization of raw materials may not be economically feasible in many cases and perhaps even undesirable from the point of view of the supplier or consumer.

In our competitive society, suppliers of fertilizer raw materials as well as other segments of our business community, vie for the favor of the customer. Progress results from this competition. Other things being equal, the producer who is able to supply consistently the type of product desired by the consumer will undoubtedly by rewarded. Product improvements benefit both supplier and user.

New Firm Established

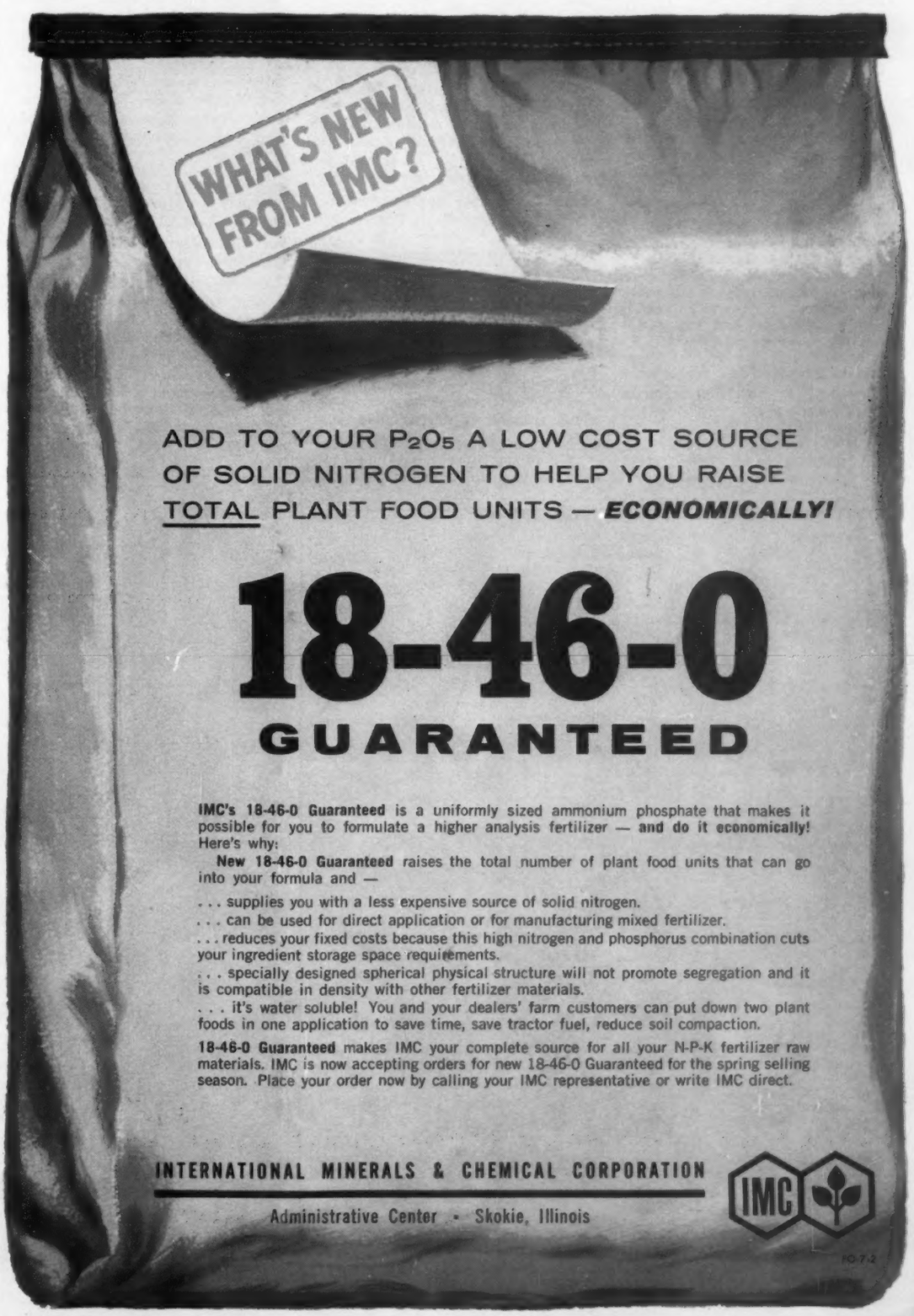
A new company, Richards Industries, Inc., has acquired the OPW-Jordan Division of Dover Corporation, Cincinnati. The latter firm manufactures regulator and control valves for industry.

Richards Industries, Inc., is headed by Gilbert B. Richards, Jr., formerly president of OPW-Jordan. Operations will be carried on as in the past, the company says, under the name of Jordan Valve Division of Richards Industries, Inc. The same personnel and sales representatives will continue with the company.

BORERS PLENTIFUL

The Iowa fall corn borer survey shows 67% of corn plants in the state are infested with corn borer, state entomologist Wilfred Craig has reported. This is almost exactly the same percentage of infestation found at this time last year, the entomologist said. The number of borers per plant, however, is slightly lower than it was last year at this time. This year there is an average of only 97 borers per 100 plants as compared with 114 per 100 plants last year.

Infestation is slightly higher in corn fields in the southeast portion of the state than in the northeast.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Dr. H. L. Marshall

Joe E. Reynolds, Jr.

Albert Spillman

Fertilizer Industry Round Table Meeting Concentrates on Materials Handling Theme

(Continued from page 1)

or storage tank at any state of unloading were also listed on the afternoon's discussion.

The control of nitrogen losses in handling systems from car to mixer was also to come in for scrutiny at the Wednesday afternoon meeting.

Storage facilities with reference to tank construction in combatting corrosion from phosphoric acid and sulphuric acid were also listed for coverage in the talks of the afternoon.

Plant safety programs and how to create and maintain interest in them was the final topic scheduled for the first day of the Round Table.

A continuation of the materials handling theme was to be heard on Thursday morning, Nov. 9, with representatives of bag manufacturers making presentations and discussing sack construction and bag packing equipment. Additional information on palletizing and stowing of bags was also on the agenda for discussion.

Problems in connection with dust collecting in plants were to occupy discussion time in the final portion of the morning session Thursday.

A presentation of how fertilizer companies in the U.S. make use of the continuous ammoniator developed by the Tennessee Valley Authority, was scheduled for Thursday afternoon. Results presented are those obtained through a survey made by Croplife Magazine earlier in 1961 through cooperation with TVA.

Progress reports on standardization and uniformity of raw materials were to be presented by representatives of nitrogen, phosphate and potash producers, and also by users of these materials in fertilizer manufacturing.

The application of the spherodizer to granulation of fertilizers was scheduled to be described in a talk Thursday afternoon, followed by discussion of the handling of liquid sulphur.

The final day of the Round Table, Friday, Nov. 10, is given over to the composition and use of new materials in fertilizer formulation. These materials include diammonium phosphates, conventional semi-granular and granular materials, and bulk blending.

Comprising the Round Table committee, in addition to Dr. Sauchelli, chairman, are Dr. H. L. Marshall, Olin Mathieson Chemical Corp., Baltimore, Md.; Joe E. Reynolds, Jr., Davison Chemical Division, W. R. Grace & Co., Baltimore, Md.; and Albert Spillman, Fertilizer Manufacturing Cooperative, Inc., Baltimore.

CFA Convention Lists Program Schedule

The California Fertilizer Assn. has announced that its 38th annual convention would be held at the Jack Tar Hotel, San Francisco, Nov. 12-14. Speakers, according to advance programs announced by CFA, include Ralph Everett, director of Empire Sales Training, Inc., Miami, Fla., on "Selling More Fertilizer At A Profit;" Stary Gange, Visalia, Cal., luncheon speaker on Monday, Nov. 13; and Paul Speegle, San Francisco newspaper writer.

According to Sidney H. Bierly, general manager of the association, the meeting includes a golf tournament for men, and varied activities for the ladies present. In the latters' schedule are golf, bridge, canasta, and bowling for both men and women. Dinner dancing is also on the agenda, the announcement indicated.

Sack Manufacturers Elect Officers for 1962

Bernard W. Recknagel, vice president, St. Regis Paper Co., was elected president and F. Gregg Bemis, chairman, Bemis Bro. Bag Co., was elected vice president of the Paper Shipping Sack Manufacturers' Assn., Inc., at its 28th annual meeting recently held at The Greenbrier, White Sulphur Springs, W. Va.

Members of the board of directors were elected as follows: F. G. Bemis, Bemis Bro. Bag Co.; T. W. Brown, Jr., Owens-Illinois; J. R. Clements, Raymond Bag Corp., Div. of Albemarle Paper Mfg. Co.; H. Holden, Kraft Bag Div. of St. Marys Kraft Corp.; W. L. Jennings, West Virginia Pulp & Paper Co.; E. K. Ludington, Jr., Chase Bag Co.; G. D. Morgan, Jr., Seaboard Bag Corp.; H. M. Recher, Union Bag-Camp Paper Corp.; B. W. Recknagel, St. Regis Paper Co.; A. A. Scholl, International Paper Co., Bagpak Div.; and Frank Pocta was re-elected executive secretary & treasurer.

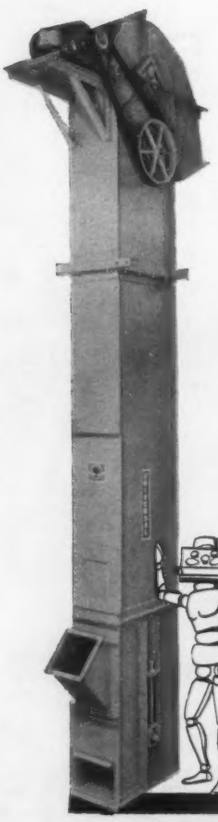
Begins Construction Work On Sulfuric Acid Plant

Leonard Construction Co., Chicago, has started construction of the contact sulfuric acid plant being built for National Phosphate Corp. at Marseilles, Ill.

The plant is to be of Leonard-Monsanto design with capacity to produce up to 750 tons sulfuric acid a day, using elemental sulfur as raw material.

The sulfuric acid plant is a part of National Phosphate's plans for a multi-million dollar expansion for agricultural chemicals. Completion of the sulfuric acid facility is expected in about nine months, according to Marvin Paullus, Leonard president.

"He used to work in a circus . . . "



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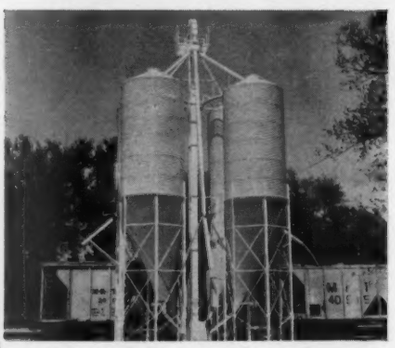

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FERTILIZER CONSUMPTION

Continued from page 2

the level of fertilizer use resulted in the second highest year in the history of the U.S.

Mixtures

In 1959-60, mixtures comprised 62.9% of the tonnage of fertilizers consumed and amounted to 15,649,622 tons. This was 2.2% below consumption in the preceding year.

Various states reported 1,870 grades. In addition, over 500 grades not reported by grade but many of which undoubtedly were duplicated in the above total, were used in California. Another unknown number of grades is involved in situations where custom mixtures are prepared by manufacturers.

Tonnages of mixtures consumed in most of the states east of the Mississippi River in 1959 were below their respective tonnages in 1958-59. On the other hand, consumption in most of the states west of the Mississippi River was above that of the preceding year.

Mixtures consumed are principally of the type containing all three primary nutrients. In 1959-60 this type represented 89.4% of the tonnage of mixtures, while the other types (N-P, P-K, N-K) amounted to 3.2%, 5.5%, and 1.9%, respectively.

The number of grades reported as type NPK were 1,316 (70.4%), N-P (190, 10.2%), P-K (169, 9.0%) and N-K (195, 10.4%). The NPK mixtures comprised more than 80% of the tonnage of mixtures in all regions except the Mountain and Pacific. In these regions, NPK mixtures represented 46.3 and 71.3% and the N-P type represented 53.6 and 26.8%, respectively.

Grades consumed in the U.S. excluding Alaska, Hawaii and Puerto Rico, in quantities of 10,000 tons or more each, numbered 127. These totaled 14,092,083 tons, accounting for 91.64% of the quantity of mixtures used in the 48 states and District of Columbia.

Other grades consumed in amounts of 2,500 to 9,999 tons totaled 116 (604,094 tons, 3.93%) whereas those under 2,500 tons totaled 1,585 (407,044 tons, 2.65%). The balance, 274,184 tons (1.78%) represented mixtures not reported by grades.

Consumption of mixtures in Alaska, Hawaii and Puerto Rico amounted to 148,141 tons in 201 listed grades. A total of 1,850 tons was recorded for Alaska, with principal grades listed as 8-32-16, 10-20-10, and 10-20-20. Many of the grades in Puerto Rico are similar to those consumed in other areas of the U.S. In Hawaii, however, most grades are designated in fractional numbers.

Approximately 90% of the tonnage of mixtures reported by grade in the U.S. (excluding Alaska, Hawaii and Puerto Rico) were represented by 37 primary-nutrient ratios. Ratios of 1:2:2, 1:1:1, 1:4:4, and 1:3:3 accounted for the largest tonnage in descending order and their cumulative total amounted to 54% of the tonnage.

Compared with 1958-59, these 37 ratios are with one exception the same, but their order of tonnage changed somewhat.

The national average primary nutrient content of mixtures in 1959-60 was 6.50% of N, 12.99% of available P_2O_5, and 12.06% of K_2O, a total of 31.55%. Compared with the corresponding averages in 1958-59 the increase was highest for N (4.50%), while that for available P_2O_5 was 3.59%, and for K_2O only 1.26%. These percentages reflect the continued trend toward increased concentration of primary nutrients and mixtures used throughout the U.S.

The high rate for nitrogen resulted from substantial increases in average nitrogen contents in 46 areas and decreases in only 5.

The average rate of increase was

TABLE 5—Changes in Consumption of Primary Nutrients Supplied in Mixtures and in Direct-Application Materials, by State and Region, Year Ended June 30, 1960, Compared with Preceding Year

State and region	Mixtures					Materials				
	N	P_2O_5		K_2O	Total (N, avail. P_2O_5, and K_2O)	N	P_2O_5		K_2O	Total (N, avail. P_2O_5, and K_2O)
		Available	Total				Available	Total		
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
Maine	-1,609	-2,363	-2,429	-2,323	-6,295	-44	473	466	-117	290
New Hampshire	-82	-303	-314	-362	-757	20	-40	-45	-20	-39
Vermont	199	442	443	662	1,303	19	219	244	-84	152
Massachusetts	214	-363	-377	-345	-494	-171	-231	-285	-163	-615
Rhode Island	-9	-58	-59	-45	-104	-3	-2	-4	9	6
Connecticut	-3	-123	-155	-383	-503	-123	-125	-130	-96	-266
New England	-1,294	-2,760	-2,803	-2,796	-6,850	-316	235	226	-477	-558
New York	-608	-1,990	-2,105	-762	-3,360	-141	-780	-750	-89	-990
New Jersey	-326	-1,856	-1,931	-1,502	-3,684	-31	-323	-361	-197	-551
Pennsylvania	752	-899	-729	-361	-388	-1,329	660	671	24	1,955
Delaware	-163	-884	-886	-593	-1,412	-17	80	123	154	217
Dist. of Col.	-18	32	34	7	71	12	1	4	11	25
Maryland	-167	-1,449	-1,550	-274	-1,890	391	-248	-252	41	176
West Virginia	-164	-61	-75	37	-188	35	162	131	-38	180
Mid. Atlantic	-696	-6,687	-7,042	-3,640	-11,021	1,549	-307	-414	-72	990
Virginia	-974	-3,561	-3,843	-2,680	-8,935	-678	-638	-305	-126	-1,642
North Carolina	-8,876	-8,921	-9,557	-9,264	-22,041	-14,600	-1,234	-1,583	-784	-16,360
South Carolina	-2,209	-6,784	-7,292	-2,801	-11,778	-8,754	-558	-873	-2,437	-9,749
Georgia	-1,804	-5,026	-5,287	-1,136	-7,964	8,752	-1,269	-1,359	-426	7,057
Florida	8,904	1,565	2,415	8,796	19,265	903	-1,017	1,215	-250	-364
So. Atlantic	41	-22,709	-23,564	-6,783	-29,451	-12,177	-4,716	-2,707	-3,965	-20,838
Ohio	3,823	4,754	4,495	-225	8,352	508	-619	-763	-62	47
Indiana	-872	-4,289	-4,520	-4,825	-9,986	10,286	-1,583	-1,260	590	9,295
Illinois	-2,722	-5,106	-5,507	-6,156	-13,984	-9,707	-1,700	417,919	-8,292	-17,699
Michigan	-2,521	-1,158	-2,505	-8,791	-18,470	974	-763	-1,045	796	935
Wisconsin	-1,387	-5,995	-6,227	-9,062	-16,444	-2,037	2,055	1,838	-531	-313
East No. Cent.	-3,679	-17,794	-19,064	-29,059	-50,532	26	-2,390	-19,149	-5,571	-7,935
Minnesota	3,250	4,094	4,113	-2,015	5,329	-12,838	1,509	1,778	-469	-11,738
Iowa	2,648	6,149	6,203	-302	6,535	6,710	-6,631	-8,084	-1,456	-1,377
Missouri	-1,684	-723	-873	-249	-2,656	1,012	-2,505	-34,673	788	-793
North Dakota	1,941	3,657	3,750	29	5,627	682	838	868	60	1,360
South Dakota	465	512	535	-28	949	-784	-880	-941	-15	-1,599
Nebraska	755	1,372	1,380	27	2,154	3,618	-224	-411	-197	3,287
Kansas	2,855	7,196	7,328	1,214	11,265	9,985	1,623	1,383	126	11,682
West No. Cent.	10,250	20,277	20,436	-1,324	29,203	8,185	-6,190	-40,099	-1,373	622
Kentucky	-14	-1,223	-2,625	-2,366	-3,603	-186	-1,070	-1,446	493	-763
Tennessee	1,819	1,461	758	3,186	6,466	5,260	583	1,082	-324	5,519
Alabama	2,188	23,901	23,829	4,335	30,364	3,201	-1,579	-1,729	-315	1,307
Mississippi	-1	1,303	1,992	1,508	3,970	5,995	-1,911	1,321	1,529	5,609
East So. Cent.	3,992	26,022	23,954	7,163	37,177	14,270	-3,977	-3,434	1,379	11,672
Arkansas	1,021	2,571	2,600	1,833	5,425	-316	-178	-53	505	11
Louisiana	1,006	1,091	1,120	2,274	4,371	3,889	685	1,475	417	6,991
Oklahoma	968	1,670	1,717	493	3,133	3,257	972	519	-26	4,203
Texas	1,698	4,849	4,600	426	6,971	20,585	2,327	2,953	-226	22,686
West So. Cent.	4,693	10,181	10,037	5,026	19,900	27,415	3,806	4,892	670	31,891
Montana	234	154	166	-51	339	1,000	640	625	-15	1,625
Idaho	1,368	2,138	2,072	83	3,588	1,484	3,592	3,712	-465	4,671
Wyoming	-32	8	5	-27	-54	524	721	726	-3	1,242
Colorado	732	1,774	1,795	116	2,622	2,576	359	430	-25	2,910
New Mexico	188	671	683	91	730	2,184	-305	-323	52	1,851
Arizona	631	1,839	1,880	259	2,729	-4,530	452	613	-58	-4,136
Utah	339	306	319	16	661	217	391	396	12	810
Nevada	-31	-55	-59	22	-46	227	-28	-29	-2	197
Mountain	3,429	6,637	6,661	508	10,574	3,602	5,812	5,912	-444	8,970
Washington	955	1,327	1,399	-422	1,860	9,782	712	869	193	10,687
Oregon	-84	19	-15	68	-17	-3,502	3,475	3,282	319	292
California	537	6,601	6,851	2,430	7,568	1,598	6,526	7,670	538	8,662
Pacific	1,408	5,947	6,235	2,056	9,411	7,878	10,713	11,821	1,050	19,641
48 States & D. C.	18,146	19,114	14,770	-28,849	8,411	50,452	2,786	-43,352	-8,783	44,655
Alaska[1]	---	---	---	---	---	---	---	---	---	---
Hawaii	843	-178	-183	1,774	2,439	-1,538	-960	-1,225	-1,980	-4,678
Puerto Rico	-1,717	-373	-461	-716	-2,806	-615	1	3	52	-562
United States	17,272	18,563	14,126	-27,791	8,044	48,299	1,827	-44,574	-10,711	39,415

1/ Data for year ended June 30, 1959 was not available for comparison.

TABLE 6—Primary Nutrients Contained in Mixtures Consumed and the Total in Mixtures and Direct-Application Materials Consumed, by State and Region, Year Ended June 30, 1960

State and region	Mixtures					Mixtures and materials				
	N	P_2O_5		K_2O	Total N, available P_2O_5, and K_2O	N	P_2O_5		K_2O	Total N, available P_2O_5, and K_2O
		Available	Total				Available[1]	Total[2]		
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
Maine	12,738	18,230	18,763	19,055	50,023	13,682	19,312	19,870	19,112	51,806
New Hampshire	1,146	1,768	1,830	1,841	4,755	1,449	2,195	2,276	1,983	5,718
Vermont	2,390	6,055	6,231	6,820	15,225	2,930	9,204	9,532	6,979	19,115
Massachusetts	5,412	8,826	7,114	6,581	18,819	6,761	7,766	8,117	6,912	21,439
Rhode Island	977	1,663	1,533	1,486	3,926	1,131	1,551	1,616	1,527	4,209
Connecticut	4,503	5,952	6,273	6,023	18,478	5,838	7,358	7,756	6,640	19,856
New England	27,126	40,294	41,753	41,806	109,226	31,742	47,388	49,177	43,093	122,223
New York	35,786	63,638	65,806	55,769	154,993	45,522	69,997	72,789	57,382	172,901
New Jersey	13,299	22,765	23,414	22,283	58,239	18,649	23,790	24,528	23,153	65,592
Pennsylvania	33,856	73,360	76,082	69,957	177,153	42,738	81,039	83,296	71,871	195,648
Delaware	4,922	9,549	9,888	10,916	25,387	5,944	9,739	10,135	11,204	26,891
District of Columbia	274	393	428	237	904	361	449	487	240	1,050
Maryland	15,483	31,368	33,469	31,273	78,124	19,731	32,368	33,177	31,819	83,915
West Virginia	2,936	7,957	8,648	7,186	17,994	3,580	9,987	10,509	7,801	20,968
Middle Atlantic	106,466	208,805	217,735	197,543	512,814	136,607	227,286	238,919	202,892	564,065
Virginia	28,675	72,287	77,113	78,192	179,154	43,083	75,630	81,097	81,624	200,337
North Carolina	59,572	120,505	129,958	137,229	317,388	115,947	123,840	133,311	144,853	386,418
South Carolina	25,033	58,550	63,493	64,316	162,899	82,203	68,638	69,689	72,088	196,889
Georgia	50,919	120,270	127,882	139,648	311,137	126,910	122,158	129,353	143,225	392,293
Florida	87,619	87,192	106,876	127,833	302,644	114,770	91,189	114,855	132,252	338,482
South Atlantic	251,818	459,304	505,322	546,818	1,257,948	482,913	673,233	526,818	574,253	1,510,399
Ohio	63,033	148,701	153,288	128,619	360,953	88,271	157,760	163,929	136,305	388,316
Indiana	58,720	150,311	154,417	143,312	352,543	132,573	161,312	168,936	184,789	478,674
Illinois	45,997	101,930	105,879	84,074	232,001	118,556	156,571	290,692	142,592	413,712
Michigan	39,325	96,344	99,598	67,980	203,769	58,204	100,469	104,355	97,952	251,625
Wisconsin	17,718	62,205	64,028	78,367	158,290	25,550	66,873	68,403	88,353	180,776
East North Central	225,393	559,771	577,196	522,252	1,307,616	423,152	642,985	797,315	642,991	1,707,100
Minnesota	27,628	88,850	90,798	60,288	176,766	54,022	114,365	117,648	68,298	230,665
Iowa	33,593	85,567	89,055	55,936	175,096	103,117	115,070	119,833	66,837	283,024
Missouri	51,786	73,492	76,769	67,362	192,620	110,240	87,459	125,789	79,180	277,009
North Dakota	8,121	14,867	15,079	1,540	24,528	28,456	14,152	49,225	1,080	70,238
South Dakota	2,033	2,992	3,191	163	5,188	7,379	7,240	7,527	186	14,825
Nebraska	5,630	12,388	12,527	1,697	19,715	125,436	26,543	27,037	2,033	156,032
Kansas	16,146	38,276	51,999	6,770	51,192	74,180	51,875	55,255	7,614	133,669
West North Central	162,917	308,230	310,488	193,756	644,903	496,819	434,904	506,481	223,666	1,175,468
Kentucky	26,313	58,087	59,468	57,674	140,076	44,517	66,374	73,433	67,116	178,007
Tennessee	30,097	59,275	62,830	59,944	149,336	41,059	68,280	71,481	68,264	195,695
Alabama	31,673	92,980	98,882	88,047	212,620	89,640	99,126	105,646	93,193	281,759
Mississippi	20,128	39,481	39,489	31,557	85,866	119,065	48,600	51,896	42,730	211,299
East South Central	108,211	242,443	257,669	237,244	587,898	316,985	280,380	301,184	271,395	866,730
Arkansas	12,463	28,815	29,267	28,827	67,305	68,316	36,103	39,767	46,332	148,751
Louisiana	12,481	22,943	24,162	20,483	55,827	60,804	26,721	29,563	22,957	109,682
Oklahoma	7,515	15,706	16,283	6,098	29,319	17,373	30,485	32,049	6,486	54,184
Texas	28,729	53,036	56,048	25,370	109,124	179,973	95,488	102,433	35,509	292,963
West South Central	61,099	121,498	126,340	78,778	261,575	326,468	188,717	199,774	102,195	603,580
Montana	690	809	843	93	1,600	4,319	13,537	13,912	98	19,954
Idaho	3,901	6,870	6,893	249	9,020	28,785	24,661	25,502	250	53,524
Wyoming	182	296	310	13	491	3,773	4,321	4,432	20	8,126
Colorado	2,621	6,623	6,805	1,197	8,441	23,318	17,477	17,891	1,596	42,583
New Mexico	512	805	927	196	1,591	10,163	8,674	8,771	288	18,925
Arizona	4,476	9,859	7,386	1,483	12,798	65,539	21,552	21,998	2,038	89,129
Utah	1,173	1,286	1,309	216	2,679	7,470	6,564	6,771	370	14,304
Nevada	248	239	253	68	573	1,182	760	789	97	1,976
Mountain	13,809	19,869	20,511	3,515	37,193	120,761	97,066	99,984	4,748	228,517
Washington	5,674	8,220	8,597	3,520	17,491	75,476	19,647	20,250	6,830	101,982
Oregon	2,906	4,918	5,066	2,734	10,558	38,103	17,381	17,712	4,210	59,694
California	37,795	62,561	66,618	23,709	105,065	3/ 268,687	3/ 105,194	3/ 109,269	3/ 36,078	409,759
Pacific	46,375	76,698	80,281	29,981	133,054	382,266	142,242	147,177	47,127	571,435
48 States and D. C.	983,414	2,017,112	2,123,291	1,851,693	4,852,219	2,605,572	2,552,291	2,866,811	2,112,322	7,380,155
Alaska	180	430	430	284	902	810	671	672	386	1,975
Hawaii	7,813	4,367	4,656	12,769	24,929	19,638	7,886	9,036	18,397	46,921
Puerto Rico	20,000	11,619	13,043	22,892	54,679	33,019	11,530	13,157	22,216	66,763
United States:										
1959-60	1,017,415	2,033,316	2,141,228	1,886,798	4,933,529	2/ 2,730,047	2,572,348	2,889,674	2/ 2,153,319	7,463,714
1958-59[4]	999,963	2,014,313	2,126,864	1,914,395	4,928,583	2/ 2,671,658	2,551,287	2,919,450	2/ 2,191,435	7,416,380
1957-58[5]	955,204	1,798,590	1,983,452	1,683,910	4,337,704	2,804,359	2,292,890	2,655,380	1,935,138	6,512,387

1/ Includes 2 percent of the colloidal phosphate and 3 percent of the phosphate rock marketed for direct application. 2/ Includes 22 percent of the colloidal phosphate and 32 percent of the phosphate rock marketed for direct application. 3/ Includes 3,566 tons N, 3,591 tons available and total P_2O_5, and 8,100 tons K_2O in an estimated 270,000 tons of dried manures. 4/ Does not include Alaska. 5/ Revised: 674 tons was subtracted from South Carolina total. 6/ Revised: 659 tons was subtracted from South Carolina total.

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substantially higher for available P_2O_5 than in any previous year since 1949-50. The mean rate of increase for the 10 year period prior to 1959-60 was 1.53%.

The average K_2O contents increased in 35 areas and decreased in 16. In 1959-60 the national average rate of increase was the lowest in any year over the preceding 10-year period, and has shown a tendency to drop each annual period.

Primary Nutrient Materials

Consumption of primary nutrient materials for direct application amounted to 7,849,664 tons and accounted for 31.6% of all fertilizers used in 1959-60. This quantity was 166,345 tons (2.1%) less than the amount consumed in 1958-59. In most states, changes in the total consumption of direct application materials closely corresponded to changes in the total consumption of mixtures.

Compared with 1958-59, decreases in consumption were largest in the phosphate class of materials, followed by natural organics and potash in the order named. The total of the class of chemical nitrogen materials increased in 1959-60.

The increase in tonnage of chemical nitrogen materials is reflected in the increase in nitrogen solutions (90,063 tons, 9.1%), urea (32,022 tons, 29.1%) and anhydrous ammonia (27,725 tons, 4.1%); while decreases were largest in ammonium nitrate—limestone mixtures, ammonium nitrate, and sodium nitrate. The largest increase in this class was in the West South Central, followed by the East South Central and West North Central regions in the order named. On the other hand, the largest decrease was in the South Atlantic region. Nitrogen solutions have continued to show a high rate of increase in the South Atlantic region.

Secondary and Trace Nutrients

In 1959-60 the total consumption of secondary and trace nutrient materials for direct application amounted to 1,378,129 tons, or 5.5% of all fertilizers used. The quantity of these materials was 154,925 tons (12.7%) more than that consumed in 1958-59.

Calcium sulfate (gypsum) comprised 1,296,955 tons, or 94.1% of the total tonnage of this class of products in 1959-60. Other principal products were sulfur, sulfuric acid, lime sulfur solution totaling 45,568 tons (3.3%), and metallic salts, 31,450 tons (2.3%).

The average content of mixed fertilizers for boron is 0.29% B_2O_3, copper (0.45% CuO), iron (0.67% Fe_2O_3), manganese (0.81% MnO), and zinc (0.48% ZnO). It was pointed out in the report that deficiencies of various minor elements occur in certain areas and under intensive culture these elements may be removed from the soil by plants, so it becomes necessary to replenish the supply. Use of secondary elements, therefore, is simply a matter of fitting a remedy to a specific need.

Primary Plant Nutrients

Some 7,463,714 tons of primary plant nutrients were included in fertilizers used in the U.S., including Alaska, Hawaii and Puerto Rico, during the year ended June 30, 1960. This represented an increase of 47,459 tons, or 0.6%, although consumption of fertilizer products containing these nutrients was less than in the preceding year.

Consumption of nitrogen was 2,738,047 tons, increase of 65,571 tons, or 2.4%. Available P_2O_5 was 2,572,348 tons, 20,390 tons more, an increase of 0.8%. K_2O decreased 38,502 tons (1.8%) from the preceding year.

Mixtures supplied 1,017,415 tons or 37.1% of the N, 2,033,316 tons or 79.0% of the available P_2O_5, and 1,886,798 tons or 87.6% of the K_2O.

Materials used for direct application supplied 1,720,632 tons or 62.9% of the N, 539,032 tons or 21.0% of the available P_2O_5, and 266,521 tons or 12.4% of the K_2O. These quantities represented increases of 2.9 and 0.3% for N and available P_2O_5, respectively, but a decrease of 3.9% for K_2O from the preceding year.

Total consumption of primary nutrients in 1959-60 was not too significantly different from consumption in 1958-59. The pattern of change in use was about the same in both mixtures and in direct-application materials in that the amount of nitrogen and available P_2O_5 increased, but that of K_2O decreased.

Consumption of one or more of the nutrients supplied either by mixtures or by materials increased in 45 of 51 areas. In 23 of these 45 areas, however, the increase in the quantity of a nutrient supplied either by a mixture or a material was offset by a decrease of that nutrient in the other category.

Nearly 70% of the total consumption of nitrogen was as N-P-K mixtures, anhydrous ammonia and ammonium nitrate—which supplied, respectively, 33.1, 21.2 and 15.2%. These three commodities accounted for more than one-half of the nitrogen consumed in each region except the Pacific. In this region, the principal use of nitrogen was as anhydrous ammonia, aqua ammonia and ammonium sulfate. Compared with 1958-59, the principal increases were in the form of N-P mixtures, nitrogen solutions, and urea. The increase in nitrogen was accountable to the greater use of N-P mixtures in the West North Central region, increases in the use of urea, particularly in the East North Central and Pacific regions, and increased consumption of nitrogen solutions in all regions.

More than 68% of the total consumption of available P_2O_5 was in the form of N-P-K mixtures. Compared with 1958-59, the small increase in consumption of available P_2O_5 was accountable mostly to the increased use of the N-P grades of mixtures and materials.

Seventy-seven percent of the total consumption of K_2O was as N-P-K mixtures. The regional use in this form ranged from 61% (Pacific) to 85% (Middle Atlantic). Although the total consumption of K_2O was less than in 1958-59, these percentages were approximately the same in both years.

TABLE 7—Grades of Fertilizer Mixture Consumed, by Region and State, Year Ended June 30, 1960

State	Consumption of 15 principal grades in indicated region (tons)															Other grades		Total tons
																No.[1]	Tons[2]	
New England																		
	8-12-12	10-10-10	5-10-10	8-16-16	0-20-20	15-10-10	6-9-12	0-15-30	11-12-14	10-15-15	10-6-4	8-9-10	8-6-4	5-8-7	5-10-5			
Maine	60,499	25,306	5,197	13,116	232	1,673	12,285	1,127	8,744	6,667	161	6,845	179	1,401	292	33	8,392	150,116
New Hampshire	581	2,967	1,382	4,400	111	1,547	0	901	0	217	222	0	185	476	385	23	1,243	14,177
Vermont	325	8,882	3,071	7,398	13,481	3,827	0	4,097	0	132	22	0	60	16	112	26	1,557	41,160
Massachusetts	682	11,578	14,319	5,113	321	2,475	0	1,399	0	0	4,305	0	2,703	2,740	2,154	28	20,202	68,121
Rhode Island	1,549	1,479	3,392	437	66	208	0	240	0	100	189	0	1,911	382	321	26	2,430	14,704
Connecticut	740	11,791	6,737	2,501	620	2,848	0	3,031	0	902	2,488	0	1,239	1,040	2,441	66	19,708	55,750
Total	64,336	61,605	36,358	33,167	12,831	12,578	12,285	10,705	8,744	7,598	7,407	6,845	6,277	6,055	5,705	90	53,532	346,009
Middle Atlantic																		
	5-10-10	10-10-10	5-10-5	8-16-16	0-20-20	3-12-6	6-12-12	10-6-4	10-20-20	4-8-12	3-12-12	5-10-15	12-12-12	2-12-12	6-12-6			
New York	125,999	70,651	91,083	58,652	17,335	969	15,396	16,195	11,180	747	2,737	9,114	18,473	84	16,748	95	62,227	517,156
New Jersey	161,660	15,964	19,521	2,833	2,000	119	4,601	9,117	1,432	899	1,613	2,059	145	15	1,659	85	90,490	213,867
Pennsylvania	268,129	58,016	26,151	41,039	37,000	21,851	11,420	5,597	9,114	7,594	8,566	1,765	2,604	4,185	916	118	82,059	586,368
Delaware	35,703	11,842	1,260	4,428	1,900	109	2,589	305	720	541	1,370	7,958	18	2,967	0	74	14,294	86,004
Dist. of Col.	143	16	2,360	0	0	0	0	876	0	4	0	0	0	18	0	18	666	4,083
Maryland	104,613	31,772	23,153	8,751	5,408	11,774	2,536	3,175	2,780	16,259	10,164	1,368	188	10,747	233	107	45,690	278,171
West Virginia	32,281	5,186	2,925	152	5,767	4,252	344	534	963	27	331	379	865	2,577	14	46	9,105	63,819
Total	668,488	193,449	165,555	116,095	69,432	39,446	36,886	35,846	26,109	25,471	25,179	22,643	22,295	20,593	19,570	214	264,491	1,749,468
South Atlantic																		
	4-12-12	5-10-10	3-9-9	5-10-15	2-12-12	4-8-12	10-10-10	6-6-6	8-8-8	4-8-8	4-7-5	0-10-20	6-8-6	6-4-8	4-10-6			
Virginia	989	203,421	52,931	4,503	110,708	5,856	49,871	0	7,319	0	0	35,576	17,171	0	3	44	158,166	646,514
North Carolina	6,879	445,381	321,491	1,071	110,239	102,213	20,981	0	40,488	0	0	12,584	33,817	0	0	40	188,610	1,284,589
South Carolina	162,740	55,007	43,373	8,006	0	71,498	6,597	0	6,135	0	0	6,679	6,523	0	72,713	46	140,849	578,405
Georgia	625,464	8,752	37,641	213,680	5,538	4,595	2,900	0	5,397	25,998	20	16,204	20,687	0	0	135	162,515	1,129,351
Florida	60,616	3,413	6,834	6,043	3,242	2,299	12,375	100,672	31,454	62,089	87,998	12,570	4,132	74,055	6	1,151	887,161	1,379,661
Total	856,488	718,214	462,270	230,505	229,802	191,461	111,724	100,672	90,994	88,087	88,018	84,013	82,332	74,055	72,724	1,197	1,537,101	5,018,460
East North Central																		
	5-20-20	12-12-12	4-16-16	3-12-12	6-24-12	10-10-10	6-24-24	5-10-10	0-20-20	7-28-14	16-8-8	3-9-27	0-10-30	10-6-4	5-20-10			
Ohio	132,324	152,431	43,185	188,581	106,834	33,792	0	90,370	20,913	1,265	21,663	490	398	13,118	8,859	148	190,582	965,148
Indiana	251,329	166,367	136,523	38,430	88,096	25,982	49,194	1,770	26,538	6,788	7,842	14,802	6,994	2,865	978	144	120,131	877,896
Illinois	66,115	71,655	69,583	22,409	13,476	62,775	31,472	66	20,441	49,975	16,925	13,105	3,007	3,894	4,742	144	149,699	599,319
Michigan	133,075	119,905	78,736	63,585	58,113	13,846	5,936	2,461	6,913	379	2,374	1,248	1,330	14,248	18,896	108	64,842	586,287
Wisconsin	108,760	5,381	47,859	22,432	4,157	28,452	46,840	181	17,252	2,042	1,147	16,223	25,672	986	440	86	58,302	369,771
Total	691,603	519,941	396,027	335,442	204,876	164,107	133,402	95,017	92,057	60,649	49,951	45,868	37,361	34,711	33,911	291	544,056	3,398,421
West North Central																		
	12-12-12	5-20-20	5-20-10	6-24-12	6-24-24	10-10-10	8-24-8	16-48-0	8-24-12	10-20-10	10-20-0	0-20-20	15-10-10	6-18-6	3-12-12			
Minnesota	10,101	84,718	5,001	55,858	28,374	9,986	28	2,314	32,115	776	1,634	8,412	0	5,743	403	176	147,099	393,162
Iowa	26,247	109,179	58,855	6,185	23,702	37,108	486	5,323	1,063	7,110	11,217	8,915	1,362	13,775	3,076	239	126,130	439,993
Missouri	215,381	17,509	1,459	3,176	14,080	9,926	31,732	923	0	8,341	0	5,814	17,869	760	17,139	34	159,212	503,367
North Dakota	435	190	65	1,099	26	91	0	4,925	904	42	0	19	0	0	0	50	42,034	49,950
South Dakota	66	19	1	105	17	90	0	218	86	98	764	0	0	230	0	61	10,730	12,506
Nebraska	1,632	489	1,401	88	96	59	476	4,134	0	1,911	3,772	521	0	1,765	0	145	33,331	49,675
Kansas	9,564	342	4	0	150	1,570	18,672	26,297	0	8,899	7,569	223	3,183	0	282	62	39,707	111,322
Total	261,830	212,548	67,806	66,511	66,445	58,650	51,396	44,234	34,168	27,087	24,996	23,908	22,414	22,273	20,900	386	558,263	1,560,587
East South Central																		
	6-12-12	4-12-12	4-10-7	6-8-8	5-10-15	0-14-14	4-12-8	10-10-10	5-10-5	0-20-20	8-8-8	5-10-10	5-20-20	0-16-8	3-9-6			
Kentucky	19,851	2,021	0	0	103,970	40	83,944	55,433	2,336	8,538	418	13,237	29,731	0	7,549	164	114,912	462,000
Tennessee	317,616	1,980	276	1,193	28,850	390	4,408	9,759	3,816	8,663	713	5,962	532	32	18,671	117	64,762	490,631
Alabama	4,606	286,400	214,841	54,993	813	105,767	3	14,302	1,170	8,031	31,732	312	663	26,223	0	60	53,471	803,367
Mississippi	5,292	2,189	4,404	147,250	0	2,416	34	0	58,638	15,477	6,218	10,569	0	195	0	49	68,638	321,533
Total	347,598	291,990	219,519	203,436	133,633	108,613	88,389	80,104	65,960	40,709	39,101	30,080	30,946	26,450	26,220	231	301,783	2,078,131
West South Central																		
	10-20-10	6-12-6	8-8-8	12-12-12	12-24-12	6-24-24	13-13-13	10-20-0	0-20-20	3-12-12	0-24-24	6-8-12	5-20-20	5-10-10	5-10-5			
Arkansas	28,708	12,166	2,438	20,433	237	5,713	4,638	386	8,140	1,216	18,534	18,215	1,705	2,480	443	57	36,098	173,770
Louisiana	7,511	7,275	39,961	27,074	1,366	15,070	8,303	0	6,986	12,419	0	199	8,552	5,544	1,666	65	22,013	164,537
Oklahoma	36,135	6,811	196	711	1,096	452	8,761	112	594	948	0	3	309	503	55	55	18,122	77,690
Texas	110,590	34,540	11,272	4,480	59,796	1,972	6,673	7,757	249	552	9	4	1,922	3,554	8,765	162	67,291	298,081
Total	183,170	58,797	53,894	52,700	62,729	23,851	19,666	17,104	15,787	14,735	18,543	18,421	13,138	12,407	11,375	216	182,723	714,080
Mountain																		
	24-20-0	10-20-5	20-20-0	8-24-0	6-10-4	18-46-0	20-10-0	8-25-0	16-16-8	16-48-0	10-20-0	7-21-0	13-13-13	10-10-10	10-30-10			
Montana	369	0	1,306	307	275	0	721	0	177	30	40	0	84	0	123	80	406	3,998
Idaho	9,312	0	344	3,978	900	0	81	0	165	150	40	1,706	117	4	499	30	2,921	19,073
Wyoming	197	0	0	6	81	54	0	0	25	147	108	0	0	0	5	18	202	1,125
Colorado	0	0	204	0	531	1,572	124	764	277	987	164	0	109	23	622	115	13,556	18,933
New Mexico	0	179	104	253	166	69	19	0	210	173	11	0	610	37	9	27	1,556	4,011
Arizona	0	7,796	5,082	744	254	344	1,702	1,863	418	966	1,413	0	646	1,187	27	65	10,668	30,844
Utah	2,278	18	174	168	2,068	0	60	0	277	0	86	0	0	0	0	23	2,271	8,100
Nevada	0	0	109	0	378	0	77	6	190	0	0	5	44	0	0	23	1,115	5,902
Total	12,316	7,993	7,323	5,466	4,051	2,824	2,784	2,633	2,439	2,055	1,882	1,706	1,491	1,315	1,241	209	34,615	92,106
Pacific																		
	10-10-10	10-10-5	8-24-0	17-7-0	15-8-0	13-8-4	6-10-4	11-8-4	10-20-20	8-8-4	4-10-10	12-15-0	20-10-0	8-25-0	6-20-20			
Washington	430	883	7,819	0	0	0	2,559	0	4,663	0	0	0	4,888	0	1,885	85	28,711	51,440
Oregon	635	0	5,906	0	45	37	1,590	0	2,802	0	0	0	291	0	2,960	57	18,263	29,550
California	29,879	27,174	15,373	10,726	9,531	9,425	5,477	8,045	0	6,849	6,719	5,811	0	4,882	0	3/ 26	136,393	336,934
Total	30,997	28,057	29,098	10,726	9,576	9,462	9,626	8,045	7,485	6,849	6,719	5,811	5,179	4,882	4,845	125	243,387	417,924
Other[3]																		
	14-4-10	15-4-7	12-6-8	14-2-8	12-6-10	10-10-8	10-6-20	8-6-10	6-8-10	13-1-12	12-4-10	12-6-16	9-10-5	12-3-16	16-4-5			
Puerto Rico	69,086	16,144	12,873	12,539	12,510	10,269	10,142	9,616	8,058	6,733	6,045	5,991	4,829	4,764	3,756	16	19,106	212,461
United States[3]																		
	5-10-10	4-12-12	5-20-20	12-12-12	10-10-10	6-12-12	3-12-12	3-9-9	5-10-15	4-16-16	5-10-5	6-24-12	0-20-20	2-12-12	6-8-8			
New England	36,358	0	0	1,003	61,605	1,583	3	0	2	6	5,705	0	12,831	0	2,557	97	224,375	346,008
Mid. Atlantic	668,488	16,444	3,339	82,195	130,449	36,846	25,179	640	22,643	833	165,555	356	69,432	20,593	0	215	504,376	1,749,468
So. Atlantic	718,214	856,488	648	2,386	111,724	21,187	50,106	462,270	230,505	308	57,011	0	5,937	229,802	37,754	1,198	2,234,480	5,018,460
E. So. Cent.	95,017	589	691,603	519,941	164,107	31,187	335,442	126	10,388	396,027	10,186	204,876	90,097	0	19	292	887,016	3,398,421
W. So. Cent.	783	187	212,548	261,030	58,650	10,781	20,800	0	12,015	4,153	66,511	23,908	30,946	0	0	190	880,141	1,560,587
E. So. Cent.	34,080	291,990	30,946	52,521	80,104	387,598	24,635	121	133,633	2,702	65,560	346	40,709	2,177	203,436	231	737,373	2,078,131
W. So. Cent.	12,407	0	13,158	52,700	5,326	6,422	14,735	0	270	0	11,375	344	15,787	0	1,032	220	580,304	714,080
Mountain	0	0	0	384	1,515	27	0	0	15	306	0	0	70	0	0	217	89,983	92,106
Pacific	2,267	0	16	446	30,297	0	0	0	0	214	0	884	0	0	0	139	380,800	417,924
Total	1,567,900	1,165,698	951,858	881,706	706,077	495,611	471,000	463,157	397,461	371,906	320,065	272,433	261,655	252,392	244,798	1,811	6,552,248	15,377,405

1/ Includes mixtures not reported by grade. 2/ Includes tonnage of mixtures not reported by grade. 3/ Total number of mixtures exceeds 500 of which only 38 were reported by grade. 4/ Total consumption of mixtures in Alaska was 1,850 tons (principal grades; 10-20-10, 10-20-20, 8-32-16) and in Hawaii 57,906 tons, comprising 175 grades, most of which were manufactured to consumers' specifications. Consumption in other possessions was negligible. 5/ Excludes Alaska, Hawaii, and Puerto Rico.

Oregon Short Course for Applicators Is Planned

Oregon State University has announced its annual short course for the state's custom applicators of pesticides for Dec. 13-15. A new Oregon state law is expected to give this year's session added significance. Recent legislation requires applicators of all pesticides to hold a state license before operating on a for-hire basis. Before the license is issued, a state examination will be given on knowledge of pesticides and the laws governing them.

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Dr. H. L. Haller Named as Spencer Award Winner

Dr. Herbert L. Haller, assistant to the administrator of the Agricultural Research Service, USDA, has been selected as the 1961 winner of the Charles F. Spencer Award, the Spencer Chemical Co., Kansas City, has announced. The award is given for outstanding achievement in the field of agricultural and food chemistry, and comprises a medallion and a $1,000 honorarium. The award was established by the late Kenneth A. Spencer, founder of Spencer Chemical Co., in memory of his father, and is administered by the Kansas City Section of the American Chemical Society.

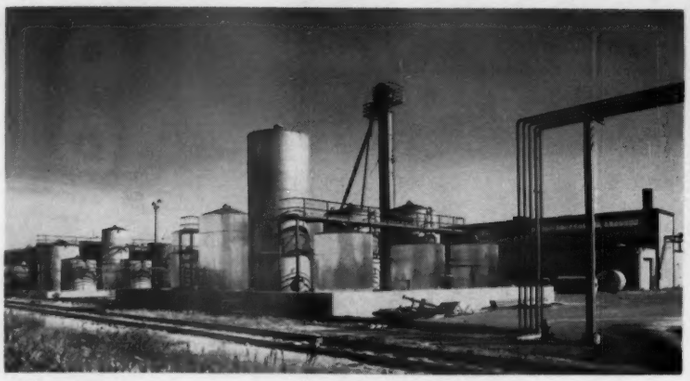
Dr. H. L. Haller

Dr. Haller is credited with a major role in discovering and characterizing a number of insecticides. His entire professional life has been devoted to the fields of research closely related to agriculture. He has been widely recognized for his basic research leading to the development of rotenone and the pyrethrins, as well as research toward developing attractants for gypsy moth.

The award winner received his doctor's degree from Columbia University. He has been associated with the Department of Agriculture since 1929.

FERTILIZER OFFICIAL DIES

Walter J. Fowler, 71, vice president of the Everglades Fertilizer Co., Ft. Lauderdale, Fla., died Oct. 4 in Miami, Fla.



PESTICIDE PLANT—The new 2,4-D and 2,4,5-T acid manufacturing plant of Thompson-Hayward Chemical Co. will begin operation in late October, the firm has announced. It is located in Kansas City, Kan. The company says the new primary process building is of steel and concrete fireproof construction and employs the latest manufacturing and safety devices. The entire manufacturing process is operated from a single control panel located in the primary process building with many of the process operations in outside locations surrounding it. Plant offices and laboratory facilities are in the process area, but most control work will be done in the new research and control laboratories also being constructed at the site. The company recently became part of the North American Philips operation and is affiliated with Philips-Roxane, Inc.

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Universal Hoist Co. Changes Ownership

Universal Hoist Co., Cedar Falls, Iowa, has been purchased by Gail G. Bonneson. Founded in 1906 by John Voorhees, management of the company has been in the Voorhees family until the present transfer of ownership.

Gail G. Bonneson

Mr. Bonneson, a CPA and a resident of Hudson, Iowa, has been active with Universal for the past 4 years as comptroller and more recently in the capacity of acting general manager.

In announcing the purchase, Mr. Bonneson stated that steps will be taken immediately to insure customer satisfaction "through distributor education, factory field service, and improved quality control." Product research and development will be strengthened and a broader line of equipment produced, he added.

New Plant for FMC Corp.

FMC Corporation (formerly Food Machinery and Chemical Corp.) has announced it will build a new multi-million-dollar plant at Charleston, W. Va., to produce toluene diisocyanate. Paul L. Davies, chairman and chief executive officer of FMC Corp., stated that capacity figures could not be disclosed because the company is exploring the possibility of forming a partnership in connection with this new venture.

NEW FARM PANEL

A farm consumer panel has been added to the market consultant services offered by Theodore Riedeburg Associates, New York, it has been announced by Theodore Riedeburg, operator of the service. He says the panel enables classification of farmers as to types, income, crops and other categories, and will be utilized in all of the firm's consulting work.

RESEARCH CENTER—Architect's drawing of new research and development building at American Cyanamid Co.'s agricultural center, Princeton, N.J. This building, largest of the group, includes laboratories, offices, library and greenhouses. The new facilities were opened officially on Sept. 25.

Cyanamid Opens New Research Center in N.J.

American Cyanamid Co. opened its new agricultural center near Princeton, N.J., Sept. 25. The new facility, said by Cyanamid to be "the most comprehensive privately-owned facility of its kind in the world," is located on a 640-acre tract.

C. D. Siverd, general manager of Cyanamid's agricultural division, speaking at the opening, said that research efforts of the new center "will be directed as much along fundamental lines as they are toward immediate product developments. Only by encouraging constant probing on the frontiers of knowledge can we provide new areas for our development people to investigate," he said.

Largest building of the center is the research and development laboratory which includes offices, laboratories, library, greenhouses, and livestock pens. The administration building contains executive offices of the agricultural division, and houses personnel responsible for production, marketing, advertising, sales, personnel, and purchasing.

The cafeteria building will serve as a meeting and conference site in addition to its function of providing a place for employees to eat.

About $1 million in laboratory equipment has been installed, and some 550 employees are working at the center. Of these, some 300 are scientific and technical people, most of whom have been relocated from New York City, Pearl River, N.Y., and Stamford, Conn.

The importance of follow-through in NH_3 and Nitrogen Solutions purchases

by Ray Funk

About the Author.
Follow-through is Ray Funk's specialty. He has been doing such work for 14 of the 23 years he has been engaged in sales work For the last six years, Ray, as Product Distribution Coordinator, has devoted his time exclusively to customer service work on nitrogen products.

* * *

Follow-through on a sale is for the seller *not* the buyer. The ideal in this follow-through is to obviate the need for the buyer to do anything further after placing the order except to be ready to receive the shipment when it arrives. As a seller, we often go beyond the delivery responsibility by helping a customer in such matters as designing facilities for storage and handling. We may also assist him with educational programs on the safe handling of the Ammonia and Nitrogen Solutions.

But there is much more than this to sales follow-through on NH_3 and Nitrogen Solutions Sales. When we receive an order for Anhydrous Ammonia or Nitrogen Solutions, we must be ready to tell the customer at any time exactly where his shipment stands and when he should be receiving it. We must know what tank cars are available, when they will be loaded and when they will leave our siding. We must also know when the railroad who receives the car will be making it into a train. And of course, we must know the routing that will most expeditiously deliver the shipment to the customer.

This same attention to follow-through is true of truck shipments. We schedule accurately the arrival, loading and departure of truck transports from the plant; the surest route and the time of delivery. During peak Spring and Summer this is critical. To us it is important that the needs of our customers are attended to without interruption regardless of the method of delivery or seasonal peaks.

* * *

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OSCAR & PAT

By Al P. Nelson

PAT McGILLICUDDY stood at the window of his glassed-in office area, hands in pockets, blue eyes shining eagerly as he looked outside. A big semi trailer was pulling out with a load of bagged fertilizer for dealers, while behind the semi came two huge bulk spreaders loaded to the gills.

"Oscar!" called Pat. "That's what I like to see—all those big loads of fertilizer going to customers. It gives me a big thrill. I talked to an efficiency man the other day at the Kiwanis meeting. He said that when you have equipment you should try to keep it busy eight to ten hours a day. That's one way to make more money, he said."

Oscar looked up critically from his neat desk a few feet from Pat's. The sunlight gleamed on his balding head. "Ach," he said critically. "Sellink—that is one thing. Collectink—that is another. You and your sellink!"

Pat grinned. He usually had to grin when Oscar talked—to keep from geting angry. "Man, what a watchdog you are, Oscar."

"Ach, I haf to be. Somebody has to stay here andt watch. You are always runnink aroundt to Kiwanis, Rotary, Chamber of Commerce andt farm meetinks, all excited like a chicken with its headt cut off. Somebody has to do the work."

Now Pat began to get a deep red. He lifted one leg onto a chair and looked at Oscar, his eyes steelly. "Now that is being too critical, Oscar," he said. "You know why I go to all those meetings. I'm keeping up with business contacts. I'm exposing myself to new ideas. I want to know how other business men think, what problems they have and how they go about facing them. I meet the county agent, prominent farmers and other agricultural leaders at these meetings. I learn a lot to help our business."

"Why don't you go to a collectors' meetink once in a while," Oscar asked sharply, "andt learn how to collect money? We got plenty on the books and it is gettink bigger every day."

Pat sighed with exasperation. "Meetings do pay off, Oscar. Two months ago I went to a western Iowa fertilizer meeting. I met a big fertilizer firm representative out there who sells throughout the area. He told me that through an advertising campaign his firm was able to spread fertilizer for farmers through December every year, even with a foot of snow on the ground."

Oscar remained critically silent.

"I came back and started an advertising campaign telling farmers they could spread fertilizer in the snow and get benefit," went on Pat. "I called a dealer meeting and informed them that they should push the idea. Now, look, our fertilizer selling is pepped up, even though we had a four inch snow early in November. I'll bet we'll be spreading at Christmas if the snow isn't too deep. That gives us more sales."

"You got too many ideas," Oscar snapped. "Why do you always haf to look for something new? Why can't we schtick with the ideas we haf been usink. Let's get better acquainted with them, before we chase another floozy."

"We can't rest," Pat said. "Competition won't let us. Now listen, the Fertilizer Industry Round Table meeting will be in Washington, D.C., on November 8. I want to attend so I can get some new ideas for us to use here. Now that we are in the manufacturing business we have to keep up with others."

"Washington, D.C.!" gasped Oscar. "McGillicuddy, do you think we are so flush with money you can go gallivantin' half way across the country to a meeting? Ach, you are worst than I thought. You are like a gypsy. McGillicuddy, I think you don't like to schtick in one place and do a goodt chob. You haf to be runnink aroundt all the time or you ain't happy."

"I can stick at one job," Pat said stubbornly. "Only this job I've got is different from yours. You sit at the desk and do all your work. I have to get out and contact people in the field, other dealers and travel."

"We haven't got any money for such a trip," Oscar said flatly, as though the matter were settled. "We haf to scratch to make the payroll the way it is."

Pat picked up a paper and held it. "Oscar so help me when we make up our budget in December, I am going to insist on a special budget for travel to meetings like this. We've got to have it. Many other firms have such a budget. That's another thing I learned at conventions."

"Don't you learn from speakers at conventions, too, that you shouldt stay home and tendt to your own knittink?"

Pat bit his lips. "Oscar, that Fertilizer Round Table meeting is worth attending. In previous get togethers they have covered such problems as dust control, safety, problems in granulation, ammoniation and information on new types of equipment. This year they are having some wonderful panels on materials handling, and ammoniation practices in the industry. We need to know about these things. If even the old timers feel they have to attend this Round Table meeting every year, then by golly newcomers in the manufacturing game ought to!"

Oscar threw down his pencil, an unusual gesture. His fist thumped the desk so hard that his green bullfrog clip container rattled.

"I listened to you, now you listen to me!" Oscar growled, his face red. "Why haf we got a smart plant superintendent? You hunted aroundt till you found Karl Meserk andt because you wanted him we are paying him $10 a week more than that Beetown Fertilizer Company at Merton is paying their superintendent. If you want to know about dust control, equipment, granulation, ammoniation and all that schtuff, ask Meserk. He's supposed to know. Why run to Washington to haf somebody tell you? Stay home. It's cheaper."

"Meserk is a very good man, but he doesn't know everything," Pat persisted. "At the Fertilizer Industry Round Table I can hear the opinions of ten or twenty men or more on each important subject."

Oscar said nothing, but the expression on his face was plainly critical. "Ach," he said finally, his eyes lighting with an idea. "You haf not hadt your vacation this year, haf you, McGillicuddy?"

"Why, no. Nora and I were planning to take a vacation during Christmas week, to visit her folks in Arkansas."

Oscar pursed his lips. "Ach, you had better take your vacation now to Washington, D.C. Then you can take in that Round Table."

"But the kids. They are in school!"

Oscar shrugged. "Ach, that is your problem, not mine. Go to Washington now as part of your vacation, or I will buck it. Or stay home, andt take your vacation in December. Look at me, I neffer take a vacation. It costs too much. So Minnie and I schtay home. We safe money that way."

Pat's lips were in a thin line. "All right—I'll go to Washington on my vocation. Nora and I will work it out. But promise me one thing—that you won't go out into the field trying to collect from farmers or dealers until I get back."

Oscar smiled thinly. "If the money is here for the payrolls, I won't go collectink. If there isn't enough money, I will go out, and I won't use soft soap with those fellers like you do."

"That's what I'm afraid of," Pat said bitterly. "I'll prevent that, though. I'll go out and collect the week before I go to Washington to make sure there's enough money here so you won't go out and collect."

Oscar looked up in amazement. "McGillicuddy," he said a little more gently, "ach, I neffer thought you wouldt learn things my way. If you keep on improvink, I will even agree to the company paying the fee for you to take a course in Collectink at the vocational school nights this winter."

California Conference Scheduled for April

The Tenth Annual California Fertilizer Conference will be held on the campus of Chico State College at Chico on April 16-17, and according to the soil improvement committee of the California Fertilizer Assn., sponsor of the conference. Theme of the meeting will be "Innovations in Fertilizer Use & Application."

George Park, vice president of Pacific International Rice Mills, Inc., San Francisco, program chairman, reports that the program is already shaping up well. Prepared papers will be presented during a portion of the program, and two panel discussions will be featured—one on the theme and the other on "Water Relationship to Efficiency of Uptake of Fertilizer."

Mr. Park said that all persons interested in soil fertility, plant nutrition, and agricultural water problems are invited to attend.

Western Distributor Plans To Expand Product Line

Wilson & Geo. Meyer & Co., San Francisco, is planning distribution of an expanded line of agricultural fertilizers, Jeffery W. Meyer, company president, has announced.

The Meyer firm will be exclusive sales agent for fertilizer products made by Stauffer Chemical Co. at a new plant at Dominguez, Cal. The new fertilizers are designed for use in California and Arizona and will be distributed in these two states.

Shipments of ammonium phosphate sulfate began in October. Additional nitrogen-phosphate and nitrogen-phosphate-potash analyses were to become available in November and December. All fertilizers will be available in bags and in bulk.

The new Dominguez plant has been under construction for the past year. It is jointly-owned by Stauffer, Shell Chemical Co., and W. L. Dixon & Co. The new facility will produce more than 50,000 tons of agricultural fertilizers annually.

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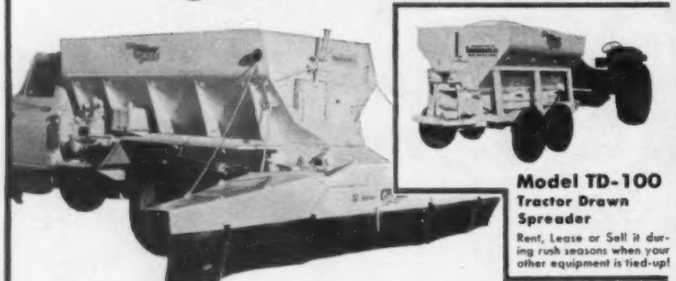

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NAC CONVENTION

Continued from page 10

personally about it. She said that housewives are conscious of their responsibilities, but become confused and puzzled by advertisements and conflicting publicity, which makes them susceptible to half-truths and the fear propaganda of faddists and others who deride chemicals.

Miss Rogers presented some ideas which she said would be helpful to the trade. These included a suggestion for advertising pointing out the trust that consumers can have in the food industry and governmental agencies organized for the people's protection. "A kind of advertising that would tell consumers why chemicals are necessary and desirable." She added that a "with and without" type pictorial presentation would be effective . . . one showing wormy fruits and vegetables contrasted to perfectly-formed produce, and also how pesticides made them completely free from insect taint.

In the area of labeling, she called for plainer language to be used. She read labels of a number of food products, and commented that the chemical terminology written on labels frightens the average housewife and does little good because the reader has no idea what the words mean. She declared that the industry's problems could be greatly reduced by use of "plainer, simpler, more informative language" on labels.

Miss Rogers suggested that the industry cultivate the friendship of food editors of newspapers, thus being able to bring before the public occasional reassuring words about the purity of foods. She also said that the trade might work more closely with food manufacturers in solving problems. In the consumers' mind, all the problems of residues and food additives are tied up in food packages, she said.

In summary, the lady speaker said that the industry's most potent weapon is the truth, and its most important duty is to *keep* the story true.

The role of the extension entomologist as a public relations agent was described by J. O. Rowell, extension entomologist at Virginia Polytechnic Institute, Blacksburg, Va. He said that since response to recommendations made by the extension entomologist is entirely voluntary, extension people must sell themselves to the public. Any extension program without the support of the public is doomed to failure, he declared, which makes the public relations aspect an unusually important one.

He told about steps taken by the Entomological Society of America toward getting more information to the public. The ESA, he said, established a committee to study the residue problem and to find ways and means to bring the truth before the public. The committee concluded that "The American public today is the healthiest, best fed and best clothed this world has ever seen; in large, because of entomological effort." This message, the committee said, should be brought to the country's entire population in strong terms.

Mr. Rowell said that extension people will be key figures in forwarding this message to the public.

In a talk illustrated by colored slides on the screen, Dr. Donald A. Spencer, biologist for the Wildlife Research Center, Denver, Colo., discussed the place of chemicals in the wildlife regions in controlling destructive pests. Such pests, he said, include various species of forest mice, certain birds, animals which destroy seedlings and, of course, insects. He said that protection of plants from wildlife damage has progressively become a major stumbling block in forest and range management.

Unlike agricultural pests, he said, many fish and wildlife "pests" are actually beneficial animals temporarily too numerous, out of place, or those which carry communicable diseases. Chemicals that repel or otherwise manage populations of wildlife without decimation are the most logical tools, he said.

In his banquet address on Oct. 31, Ivan A. Nestingen, Under-Secretary of Health, Education and Welfare, told the NAC group that the department's blueprint for the future is to utilize the basic foundation provided in laws now in operation, strengthen their enforcement to give maximum protection afforded under the law, and to change the law as experience and new scientific knowledge point the way to improvement. Mr. Nestingen appeared before the group in place of Hon. Abraham Ribicoff, HEW Secretary, who was unable to attend the meeting because of pressure of his work in Washington.

Mr. Nestingen discussed the liaison committee established recently, representing the U.S. Departments of Defense, Agriculture, Interior, and Health, Education and Welfare, to study some of the problems involved in pesticidal residues and foods.

He declared that the existence of such a liaison group will help to assure that "we have one governmental policy on the use and control of pesticides." and termed as "truly awesome" the department's responsibilities in the pesticide area. That the knowledge of toxicity testing has been improved greatly, was cited by the Under-Secretary, but "there is still much more to be learned," he added. "We must recognize the possibility that advancing knowledge may show that our present system of control needs improving still further."

Mr. Nestingen asked his hearers to keep in mind that "we are still in a 'revolutionary' and an 'evolutionary' period. This applies to both the development of new and wonderfully usevelopment of new and wonderful useful chemicals and to learning how to control their use for the safety and benefit of mankind." He chided those who say "there is no evidence of injury to man from pesticide and other food-chemical uses," declaring that this evades the main point of the protective plan established in the law. "It is not enough merely that there be no positive evidence of injury to the public health," the official declared.

"Such evidence might be exceedingly difficult to get, even if it existed." he went on. "And if we ever get it, after the fact, then use our system of control will not have accomplished its purpose. This system requires that there be positive evidence before a chemical is introduced into our food supply, and it presumes the availability to the government of adequate technology and resources to make it work. This is our challenge. If it should become apparent that we cannot make the system work, we would have the responsibility of asking Congress for a different system of control."

Dr. C. Herbert True, vice president, Visual Research, Inc., South Bend, Ind., gave his luncheon audience on Oct. 30 an entertaining illustrated lecture on the responsibilities of citizens in the areas of home, church, school and community. The speaker contrasted the philosophies of people seeking "security at all cost" with those who are willing to risk something to move ahead. He emphasized the value of ideas and expressed appreciation for the American system which permits one to make choices in life, and freedom to fail as well as to succeed.

Luncheon speaker on Oct. 31 was Miss Cathy Bauby, model and personality guidance expert, who addressed her audience of both ladies and gentlemen on how to maintain attractive figures, how to stand, talk, walk and exercise properly.

Chief Kay-Two-Oh and the Pee-Cee-A tribe have but two products: potash and service. The Chief feels that an important part of this service is to remind customers that January 31 is the last day on which potash can be shipped at lower prices under the graduated price scale. □ "Order now. Save heap much wampum," says the Chief. □ Canny buyers know that it's good business to plan ahead and keep warehouses full of Pee-Cee-A products. The motto of good Scouts, both Boy and Indian, is: "Be prepared!"

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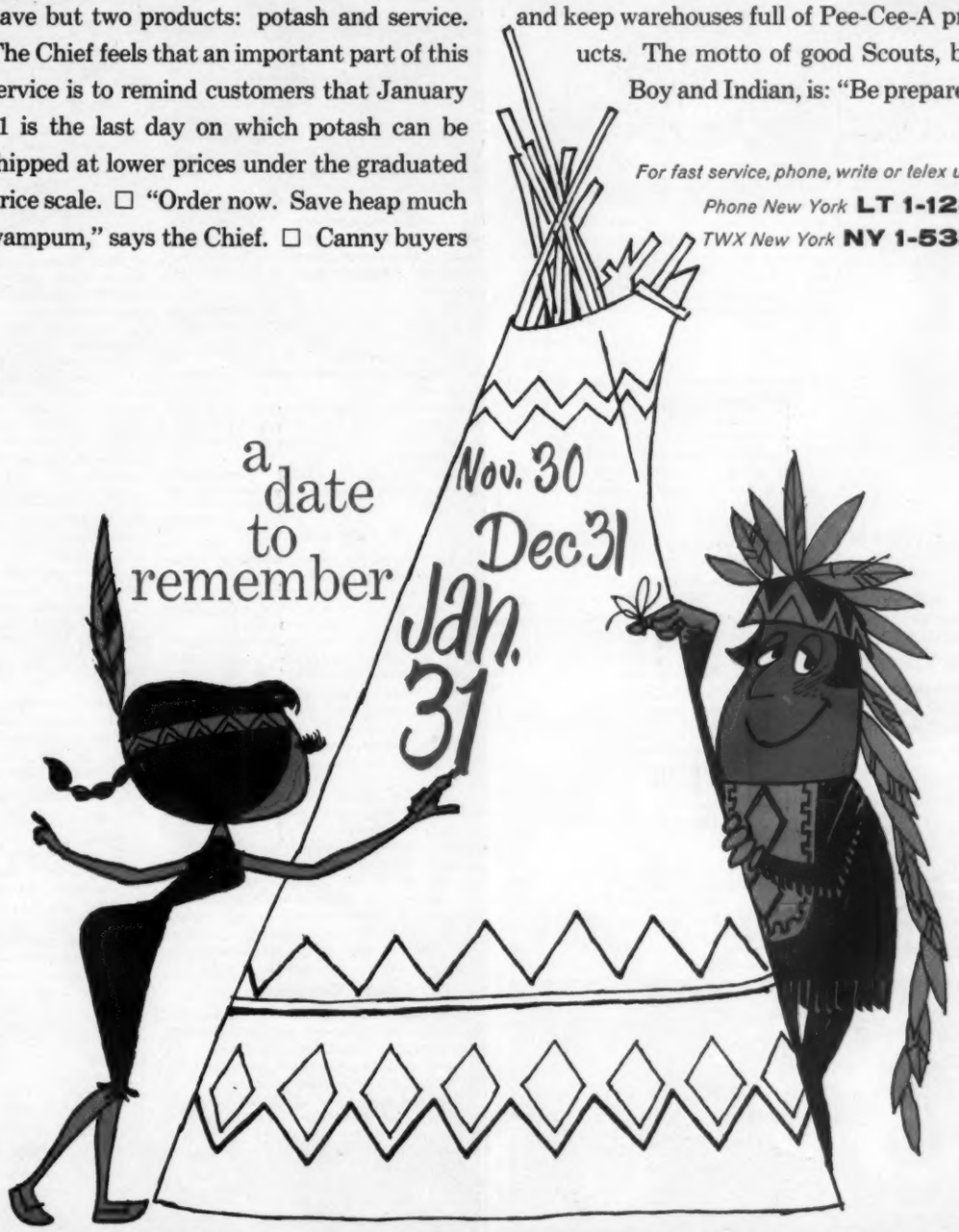

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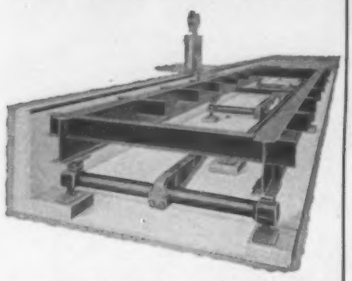

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Safety Check List Reveals How You're Doing in Plant

AS MANUFACTURING of fertilizers and pesticides becomes more complex, the need for definite safety programs in plants is likewise more acute. The fertilizer industry is currenty participating in safety schools in various portions of the country and much interest has been generated through this and other means of pointing up the desirability of maintaining a good safety record in the plant.

For many years, the subject of safety, like the weather, was discussed frequently whenever management-minded men would meet. But unlike the case of weather, safety promotion has now become an active development and the program is undergoing constant enlargement and improvement.

Labor turnover, increased training costs, extra production expense, lost unit production are but a few of the losses suffered when an accident occurs. The employee suffers the physical pain, the lost hours, the medical expense, and may develop a fear of returning to work where the accident occurred.

Figures reveal that more than 380 million production days were lost during 1960 by industrial accidents. Broken down to a per man basis, it means that there was an average of eight days lost for each worker. Thus, if 50 workers are employed in a plant, 400 days of production time is lost on the average during the year through accidents.

Some firms have started, then abandoned safety programs because they could not see that the expense involved in keeping the plan in operation was worthwhile. Other executives may become discouraged when plans fail to operate at top efficiency, and decide to drop the entire safety program.

Following is a check list to review before any decision is made to completely discard the safety program, or before starting an accident prevention program. Check each statement that can honestly be answered with an unqualified "yes". . . . multiply the number of checks by two when completed. . . . and the plant's safety score will be established.

Safety Organization

☐ Has top management been completely sold on the value of a safety program? (Unless this question can be answered YES in resounding tones, the balance of these questions will have little value in reducing accident rates.)

☐ Has complete cooperation come from the middle-management staff for the safety program?

☐ Has the safety program been integrated as a definite part of the production acivity?

☐ Has a safety director been appointed, or a safety committee selected to handle the details of the safety program? (Both of these plans are considered in the following sections of this safety check list.)

☐ Has your safety program been set up so there is an easy flow of communications both up and down the organization channels?

☐ Are regular top-level conferences scheduled to consider the progress of the safety program?

Safety Director

Using either a safety director or a safety committee will help maintain a low accident rate in the plan.

If a safety director is used, then these questions should be considered:

☐ Has one person (full or part-time) been selected to handle the work of the safety director?

☐ Does this safety director have the authority to direct and to coordinate the safety program?

☐ Is the safety director responsible for the success of the entire safety program?

☐ Does the safety director know the employees and have an understanding of their problems?

☐ Is the safety director able to delegate authority and responsibility for the various phases of the safety program?

☐ Is the safety director able to contact and deal with the employees in a helpful and satisfactory manner?

☐ Is quick action taken on recommendations made by the safety director?

Safety Committee

If a safety committee is functioning, the following questions should be carefully checked about its activities:

☐ Is the safety committee composed of both workers and supervisors?

☐ Is there a plan for adding new people to the safety committee periodically?

☐ Does the safety committee determine standards for safeguarding equipment and machinery?

☐ Does the committee formulate and check on the observance of safety rules?

☐ Does the safety committee investigate all accidents and make recommendations for the elimination of the hazard that may have caused the mishap?

☐ Does the safety committee review safety suggestions and pass on their practical application?

☐ Does management take action on the recommendations made by the committee?

Safety Training

☐ Have all workers been informed of what accidents mean to them personally in both a physical and a financial sense?

☐ Do the employees understand the cost of accidents to the firm and know how this affects their earnings and their security?

☐ Have the employees been instructed in the safe way to perform their work assignments?

☐ After the initial safety instruction, are the employees required to perform the task in the safe way?

☐ While the employee is performing the task in training, does the trainer (safety director or supervisor) check to be sure it is completed safely?

☐ Has some system of periodic check-up on the safety training been set up on a departmental level?

☐ Are the workers encouraged to make suggestions for ways and means of preventing accidents in their departments?

☐ Are regular conferences on safety conducted on the departmental level?

Safety Reports

☐ Does the plant have a system of safety reports that keeps management up-to-date on the firm's safety status?

☐ Does management require a periodic report from each supervisor describing conditions in his department that need safeguarding to avoid future accidents?

☐ Are safety reports followed up with inspection tours to check on all danger spots reported?

☐ Do you have the supervisor reporting these unsafe conditions accompany an executive on this tour of inspection?

☐ Are the most serious conditions reported on the safety reports corrected first even though they require a larger expenditure?

Accident Reports

☐ Is an accident report made out every time there is any type of accident in the plant?

☐ Do accident reports pinpoint the location where the mishap took place?

☐ Do accident reports indicate whether one age group of employees has more accidents than another?

☐ Do accident reports indicate which shift has the largest percentage of accidents?

☐ Does management know the cause of the largest percentage of accidents?

☐ Has an accident report analysis been made for the past three or four years to determine the pattern of accidents?

Safety Stimulation

☐ Has a safety contest or a safety drawing been held within the past year?

☐ Is some type of reward given to employees with a good safety record?

☐ Are signs, posters and slogans used to keep employees conscious of safety all the time?

☐ Is local publicity given to the plant's safety program and its safety record?

☐ Is individual safety performance recognized on bulletin boards or in company published material?

☐ Has a program of promoting home safety been considered for its carry-through value on the job?

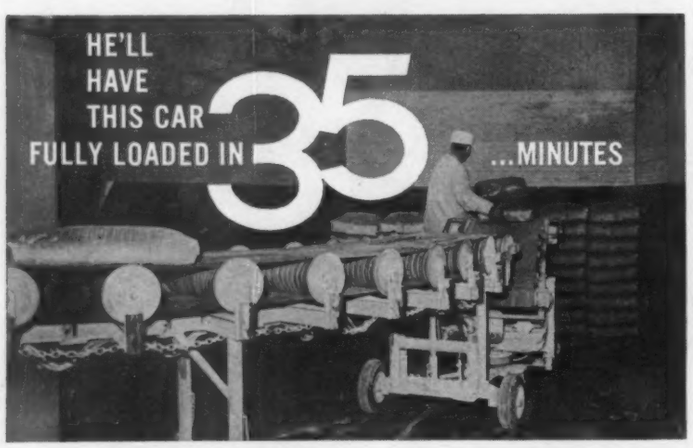
☐ Has anyone in the plant considered a program of personal letters to employees who have worked without an accident for certain periods of time?

Safety Equipment

☐ When considering new equipment, are the safety factors always considered before making a decision?

☐ When making any change in production, are possible dangers of accidents taken into consideration with this change?

☐ Are the employees provided with the latest in personal safety equipment for their jobs, and required to use these devices?



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THE WINNER of an intra-company contest for the title of "Outstanding Superintendent of the Year" would certainly appear as a likely candidate for Croplife's citation of "Production Man of the Month." And that is exactly what has happened here.

R. A. Parnell, production boss at the Charlotte, N.C., plant of F. S. Royster Guano Co. was selected by his company from among its 21 plant superintendents on the basis of records made in safety, analysis, inventory, labor-hour standing, and the lack of customer complaints. His plant records were compared with those of the other 20 operations, and found to be superior.

What kind of a fellow is this outstanding superintendent? According to his contemporaries at Royster, Mr. Parnell has been through the production end of the fertilizer business from the bottom to the top. He began his career at Royster in 1941 as a batch weigher at the firm's Wilmington, N.C., factory. Shortly thereafter, World War II interrupted his fertilizer plant work, as he put aside the shovel to take up a temporary career in the U.S. Army Air Corps.

Returning from active duty, he returned to Royster as a foreman at Wilmington, and was later made assistant superintendent. In 1949 he was named superintendent. This position of responsibility kept him busy at Wilmington until 1953, when he was transferred to Royster's Charlotte manufacturing unit where he remains today.

During his career at Charlotte, he has been consistent in his high ratings, having taken the top production award in 1958 as well as in 1961.

The Charlotte factory has wet and dry mix, and shipping facilities. It has 30 to 35 permanent employees and at peak production may have as many as 100.

Active in civic and church affairs, Mr. Parnell is a member of the Thomasboro Civic Club, Thomasboro Presbyterian Church, where he is president of the Coed Sunday School Class. He is also a former first vice commander of the American Legion.

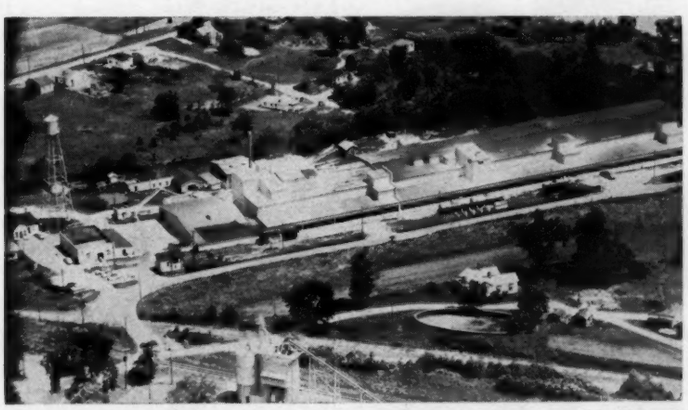
Mr. Parnell also has an active interest in Boy Scouts, and at present is committeeman and treasurer of a Charlotte troop.

The Royster company observed its 75th anniversary recently, noting the growth of the firm from a tiny production unit which turned out some 250 tons of plant food in its first year, to the present organization comprising 24 Royster and subsidiary plants serving a 22-state area, plus some areas of Canada. The company also operates some 18 regional sales offices.

In view of the company's history, Mr. Parnell as its outstanding superintendent of the present time, has a great deal of progressive tradition to form a backdrop. The founder of the company, F. S. Royster, launched his enterprise on a policy of "service to the farmer," and the company officials of the present continue to operate on the basic principle of service.

The founder was somewhat of an innovator in that he experimented with the application of potash as a control for cotton rust which, before the turn of the century, was vexing southern planters. When the idea worked, the Royster company began widespread sales of the mineral in the cotton states.

In his efforts to produce quality products efficiently and introducing better methods of maintaining quality, safety and an effective working organization, Mr. Parnell appears to be doing his job well in keeping with company custom of long standing.



Charlotte, N.C., fertilizer plant of F. S. Royster Guano Co. where Mr. Parnell is superintendent. This facility is one of 21 owned and operated by Royster.

Thompson-Hayward Starts Construction of New Lab

Thompson-Hayward Chemical Co., Kansas City, Mo., has announced the beginning of construction work on its new laboratory and plant office building. The two-story structure with 20,000 sq. ft. of space, will be completed in about six months, the company says.

The new facility will house four different activities of the company. These include quality control laboratories; research and development laboratories; offices and personnel of the plant's production management staff, and locker, shower, and lunchroom facilities for chemical production employees.

In the latter category, duplicate locker rooms will be separated by showers and toilets so that work clothes may be left in one locker room, a shower taken and street clothes put on, which had been kept in a separate locker room during the day.

One of the safety features contained in this facility is an emergency vent system located in each laboratory bay, so that at any time laboratory technicians may release undesirable odors or gases. In addition to this, the building is constantly maintained at a higher-than-atmospheric pressure so odors and gases will flow out through relief vents rather than into corridors. All laboratory bays have two exits in the event of emergency, the company says.

A pyrex glass and drainage system, individual bay-controlled air-conditioning and de-ionized water piped to each bay are among the conveniences to be used by technicians and personnel.

The new laboratory will supplement chemical manufacturing, formulation, and distribution activities of Thompson-Hayward and its 19 branch offices located in the Midwest.

TWO FLIERS KILLED

Two crop dusters were killed when their plane crashed near Boerne, Texas, recently. The two men were L. W. Harris, owner of the Harris Flying Service at Littlefield, Texas, and Owen Hughes, one of the flyers who worked for Harris. The men had been on a trip to south Texas, and crashed on a hill during the return trip.

NEW PLANT—Vulcan-Associated Container Companies, Inc. will build a new plant for Vulcan Containers, Inc., at Bellwood, Ill. Construction is now under way on the new structure, architect's drawing of which is seen above. The new facility will produce pails, drums and other containers, according to Gordon D. Zuck, president of Vulcan-Associated, parent company.

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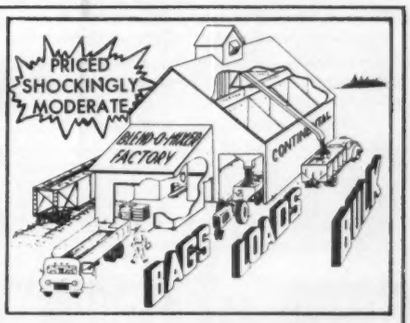

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Closer Cooperation With AOAC Suggested By Chemical Control Committee of NPFI

A FURTHER opportunity for cooperation in broadening the base for checking out methods of chemical analysis of fertilizer is seen in the recently-adopted resolution formulated by the chemical control committee of the National Plant Food Institute, and presented to the Association of Official Agricultural Chemists for approval.

As fertilizers become more complex and the need for maintaining grades with the least possible variation becomes more demanding, the move by the NPFI committee is both timely and well-conceived. A forthright resolution directed to the AOAC calling for closer cooperation and participation with that group in the planning and testing methods of analysis can be a long step toward solving some of the industry's problems in this area.

The NPFI, in commenting on the resolution, said it "looks toward the development of more accurate fertilizer chemical analytical methods which will benefit farmers, industry, and the control groups alike." The chemical control committee of NPFI declared that one result of this program would be the achievement of greater accuracy in methods of analysis. The committee members pledged their cooperation to AOAC and indicated the laboratory facilities of fertilizer manufacturers currently participating in the Magruder Check Sample series, as well as additional laboratories which will be enlisted later in an effort to improve methods in fertilizer analysis.

Portions of the NPFI resolution read:

"WHEREAS the methods of the AOAC are the yardstick by which fertilizers and fertilizer materials are judged, both for regulatory and commercial purposes, any actions taken by the AOAC are of vital importance to the fertilizer industry; and

WHEREAS the AOAC recognized this principle (of essential cooperation) in its acceptance of liaison from industry to the Associate Referees on fertilizer analysis, and the Chemical Control Committee appreciates the value of this liaison, and considers it necessary to increase its participation in the development and evaluation of analytical methods; and

WHEREAS as a precedent, your officials have requested active participation by industry in such development and evaluation:

NOW THEREFORE BE IT RESOLVED that the National Plant Food Institute, through its chemical control committee, now seeks opportunity to further participate with the AOAC in the planning and testing of methods of analysis.

The facilities of industry can be utilized in the areas of:

1. Statistical design of experiments for the evaluation of old, new and proposed methods;

2. Exploiting the reservoir of potential collaborators available in the subscribers to the Magruder Check Sample, furnishing a broad cross-section of the regulatory and industrial laboratories of the country."

Communication With Farms Difficult But Necessary

THE problem of communication between agriculture and urban dwellers apparently is becoming greater all the time. This affects the fertilizer and pesticide industries alike since both face the necessity of reaching city people with the message of how important the use of chemicals is to growers of food.

William E. Richards, president of the National Association of Soil Conservation Districts, emphasizes this point in a recent communication. He says he is continually impressed with the accelerating rate of urbanization in America. "This is evident not only in the highly concentrated population centers of the U.S., but at the edge of every town and city," he says

Mr. Richards continues by pointing out that more and more of our population is having less and less direct contact with our farms and ranches. "Forty years ago," he says, "a very high percentage of people living in urban areas had either come directly from the farm or ranch, or were the sons or daughters of people who had.

"Today, we have just the reverse of that situation. A high percentage of those living in urban areas are sons or daughters of parents who were born in the city, and who have spent their lives there. Only a very small percentage of our urban people have any direct blood relationship with those still living in rural areas.

"The result of this trend is that fewer and fewer citizens have any intimate knowledge of the problems of agriculture. The opportunities for mutual cooperation become fewer and farther between. This lack of communication and understanding of each other's problems often breeds suspicion, and certainly contributes to an unsympathetic attitude toward the problems of each."

This is why continual emphasis on some kind of "grass roots" public relations program for the chemical industry is so important. Mr. Richards has made a profound observation in noting these matters.

It is largely up to individuals in the trade to spread the word in their own communities about how important agriculture is to urban life and also, in turn, how important the use of chemicals is in growing the food that city people take for granted.

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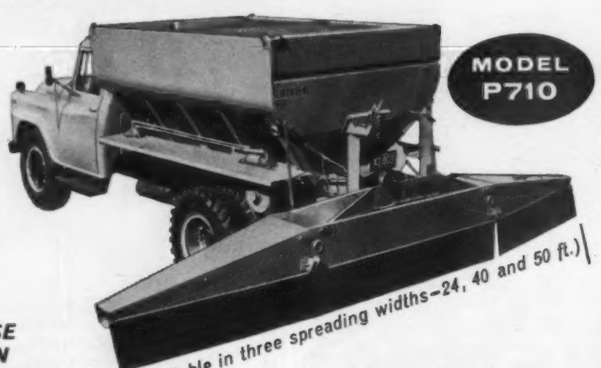

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EXECUTIVE AND EDITORIAL OFFICES—2501 Wayzata Blvd., Minneapolis, Minn., Tel. FRanklin 4-5200. Bell System Teletype Service at Minneapolis (MP 179), Kansas City (KC 295), Chicago (CG 340), New York (NY 1-2452), Washington, D.C. (WA 82).

Published by

THE MILLER PUBLISHING CO.

2501 Wayzata Blvd., Minneapolis, Minn. (Address Mail to P.O. Box 67, Minneapolis 40, Minn.)

Associated Publications—The Northwestern Miller, Farm Store Merchandising, Feedstuffs, Feedlot, Professional Nursing Home, Home & Garden Supply Merchandiser.

November, 1961

Nov. 8-10—Fertilizer Industry Round Table, Mayflower Hotel, Washington, D.C.

Nov. 12-14 — California Fertilizer Assn., thirty-eighth annual convention; Jack Tar Hotel, San Francisco.

Nov. 13-14—Oklahoma Fertilizer Dealers and Plant Food Conference, Tulsa Hotel, Tulsa, Okla.

Nov. 14-17—Mexican Assn. of Insecticide and Fertilizer Manufacturers, Hotel La Perla, La Paz, Lower California, Mexico.

Nov. 16-17—Fertilizer Industry Safety School, Jung Hotel, New Orleans, La.

Nov. 27-30—Entomological Society of America, annual meeting, Miami, Fla.

Nov. 27-30—American Society of Agronomy annual meeting, with Soil Science and Crop Science Societies included, Sheraton-Jefferson Hotel, St. Louis, Mo.

Nov. 30-Dec. 1—Fertilizer Industry Safety School, National Safety Council Headquarters, Chicago, Ill.

December, 1961

Dec. 4—Annual Soils and Fertilizer Short Course, University of Minnesota Farm Campus, St. Paul, Minn.

Dec. 4—Washington Liquid Fertilizer Dealers Assn., annual meeting, Hotel Davenport, Spokane, Wash.

Dec. 5-7—National Aviation Trades Assn., 22nd annual convention, Statler Hotel, Washington, D.C.

Dec. 6-7—Alabama Soil Fertility Society, Whitley Hotel, Montgomery, Ala.

Dec. 7-8—Fertilizer Industry Safety School, French Building, 551 Fifth Ave., New York City.

Dec. 7-8 — Michigan Fertilizer and Lime Conference, Kellogg Center, Michigan State University, East Lansing, Mich.

Dec. 11—Washington State Liquid Fertilizer Dealers Assn., annual meeting, Davenport Hotel, Spokane, Washington.

Dec. 11-14—Weed Society of America, annual meeting. Sheraton-Jefferson Hotel, St. Louis, Mo.

Dec. 13-14—Louisiana Fertilizer Conference, Capitol House Hotel, Baton Rouge, La.

Dec. 13-15—Oregon State University annual short course for custom applicators of pesticides, Corvallis, Ore.

Dec. 14-15—Ohio State Fertilizer and Lime Conference, Agricultural Administration Building, Ohio State University.

January, 1962

Jan. 3-5—Northeastern Weed Control Conference, 16th annual meeting, Hotel New Yorker, New York City.

Jan. 4-5—Arkansas Plant Food Conference, Marion Hotel, Little Rock, Ark.

Jan. 5-6—Western Colorado Horticultural Society, Civic Auditorium, Grand Junction, Colo.

Jan. 9-10 — Texas Fertilizer Conference, College Station Student Center, College Station, Texas.

Jan. 10—Fertilizer Industry Representatives Conference, Memorial Union, Iowa State University, Ames, Iowa.

Jan. 10-12 — Agricultural Ammonia Institute, eleventh annual convention, Sheraton-Jefferson Hotel, St. Louis, Mo.

Jan. 15-17—Georgia Plant Food Conference, Continuing Education Center, Athens, Ga.

Jan. 16-17—Purdue Annual Agricultural Pesticide Conference, Memorial Center, Purdue University, Lafayette, Ind.

Jan. 16-17—Fertilizer, Machinery & Chemical Exposition, for 1962, Pershing Municipal Auditorium, Lincoln, Neb.

Jan. 17-19—Southern Weed Conference, 15th annual meeting, Hotel Patten, Chattanooga, Tenn.

Jan. 18-19—Southern Farm Forum, 15th annual meeting, Roosevelt Hotel, New Orleans, La.

Jan. 23-25—Fourteenth Annual California Weed Conference, Hotel Sainte Clair, San Jose, Cal.

Jan. 25-27 — Agricultural Aircraft Assn., 12th annual convention, Hotel El Mirador, Palm Springs, Cal.

February, 1962

Feb. 5-7 — Southern Agricultural Workers, Jacksonville, Fla.

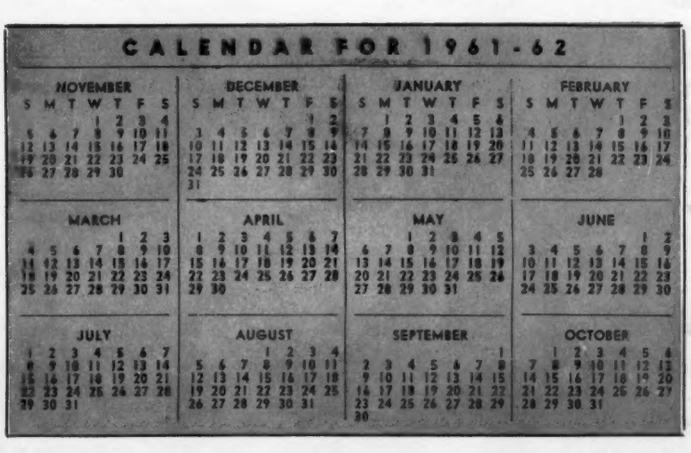
Feb. 12-13—Short Course on Fertilizer Technology, Purdue University, Lafayette, Ind. Sponsor: Soil Science Society of America.

Feb. 13-14 — Aquatic Weed Control Society, 3rd annual meeting, La Salle Hotel, Chicago, Ill.

Feb. 15-16—Annual joint meeting, Midwestern Agronomist and Fertilizer Industry, Edgewater Beach Hotel, Chicago. Sponsor: National Plant Food Institute.

March, 1962

March 13-14—Symposium on Packaging of Chemical Products, sponsored by Manufacturing Chemists' Assn., Chase-Park Plaza Hotels, St. Louis, Mo.



Bemis Acquires Assets Of Plastic Film Company

Bemis Bro. Bag Co. has entered into an agreement with the Plastic Film Company, Inc., of Plainfield, Conn., to acquire the assets and business of the corporation as of January 2, 1962, according to a joint announcement Oct. 10 by F. G. Bemis chairman, and William B. Nichols, president of Plastic Film.

Plastic Film specializes in the coating and laminating of a wide variety of materials, including paper, plastics, foil, and films. Its sales in the year ended Sept. 30, 1961, were $12.5 million. The company has been successful in development of specialty products of a proprietary nature.

Plastic Film will be operated as a wholly-owned subsidiary of Bemis. Its present management will continue with Mr. Nichols becoming chairman of the board, A. C. Bruce, president, and E. V. Disch, vice president and general manager. A. E. Anderson, T. A. Lancaster and D. C. Merritt will continue as vice presidents.

Plastic Film will become the fifth subsidiary which Bemis has acquired or formed during the past 2½ years. Others include Rose Ribbon & Carbon Mfg. Co., Harrison, N.J.; Morgan Adhesives Co., Stow, Ohio; Air-Formed Products Corp., Nashua, N.H., and Packaging Frontiers, Inc., Waltham, Mass.

J. G. Hastings

NEW PRESIDENT—J. G. Hastings, Chipman Chemicals, Ltd., Hamilton, Ont., Canada, was elected president of the Canadian Agricultural Chemicals Assn. during the group's recent annual conference at Mont Tremblant, Que. Other officers named at the meeting were D. K. Jackson, Monsanto Canada, Ltd., Montreal, first vice president; C. R. Burrows, Allied Chemical Canada, Ltd., Montreal, second vice president; L. A. Miller, Shell Oil Co., Toronto, secretary; H. S. Smith, Allied Basic Chemicals Co., Toronto, treasurer, and E. W. Phelps, Niagara Brand Chemicals, Burlington, Ont.; J. E. Enns, Du Pont of Canada, Ltd., Montreal, and E. G. Law, Allied Chemical Services, Ltd., Calgary, directors.

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